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THE  
DENTAL RECORD:

A  
MONTHLY JOURNAL  
OF  
DENTAL SCIENCE, ART, AND LITERATURE,

DEVOTED TO THE INTERESTS OF THE PROFESSION.

EDITED BY  
THOMAS GADDES, L.D.S.ENG. AND EDIN.

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VOL. VIII.

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## EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY

*(Delivered at the National Dental College.)*

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

*(Continued from page 528, Vol. VII.)*

I WOULD like to say something about the principles governing the proper formation of cavities. These are general and special ; the former apply to all cavities, the latter to special classes. The general principles are : First, the removal of all soft decay except over the nerve in deep-seated caries. This we do mainly for physical reasons, as we cannot expect even an amalgam filling to withstand the force of mastication if it is built on a soft foundation. When force is applied the foundation yields, and the stopping leaks as a consequence. Formerly we were taught in the text books that if we wish to preserve a tooth by stopping we must remove every trace of decay, even if in so doing we expose the nerve, otherwise the decay would perpetuate itself under the filling. Now we know that the function of a plug is the same as that of a cork in a bottle ; if the cork is tight and impervious, and the neck where the cork is inserted is hard and smooth, the contents are preserved.

The second general principle is the shaping of the cavity so as to make it accessible as the stopping to be put in requires, in addition to which the interior should be so excavated as best to keep the filling in place ; for example : for cohesive gold, all parts of the cavity should be accessible to the direct force applied to the plugger. Some operators take the ground that if you cannot see all parts of the cavity by direct light, it should not be filled with gold—that I believe to be incorrect teaching ; but, as with all extremes, truth is found between them. Make the cavity as accessible as the occasion calls for ; better to use a little hand-pressure than unnecessarily cut

away the sound tooth structure ; better to work in almost inaccessible places than tire out your patient by prolonged grinding ; at the same time remember that fair access is essential to good work, and shortens materially the time required for filling. I have noticed that the best operators cut the teeth the most ; while the reverse is also true—the poor operator is generally saving of excavation.

The cavity should be made so as to retain the stopping, except when oxyphosphate is used. All other than the white cements have little or no cohesion to the tooth itself, and merely play the part of corks, consequently you must rely upon retaining points, undercuts, or dovetails.

The third general rule is to leave the walls of the cavity as strong as possible, to remove all thin edges of enamel, grind down all projecting points, and thoroughly smooth all edges, preferably with a fine corundum point.

Fourth general rule: See when you come to close the orifice of the cavity, when cohesive gold is used, that the gold is thoroughly beaten against the edges, and to do this effectually the edges should always be at or near a right angle to the *axis of your plugger*. With amalgam this would leave the edges thin and liable to break, consequently for that material the edges of the cavity should be made at right angles to or perpendicular to the surface of the tooth.

The special principles governing the formation of cavities will be developed as we proceed.

Let us take up first, cavities between the incisors. The first special rule is to examine carefully the labial and palatine walls of the cavity ; if both are strong, then enter the cavity from the front, excavate and fill. This should always be done except when there are some special reasons, objection to the gold showing, &c., when some other course must be taken. It is remarkable how fair access to a cavity can be had through a very small opening, and unless the cavity is large the gold will hardly be perceptible. Opening the cavity in this way enables one thoroughly to remove all decay, to fill well and quickly ; whereas if one has to do the work from behind, through the palatine opening, it is not only much more difficult, but is likely not to be thoroughly done. However, should the palatine wall be too thin to be kept, then open at that point, and show your skill by filling from the rear. Should both walls be poor and thin, better to



remove them both than endanger your work by their subsequent breaking down. Then drill out a good pit in the cervical edge of the cavity, as you must get your principal support from this part, and get what undercut you can under the cutting edge. Some times a very good pit can be made between the plates of the enamel near the cutting edge. It is sometimes wise, as additional security, to drill a hole in the palatine aspect of the tooth, and, having cut under, connect it with the main cavity by a dove-tailed channel. Contouring the front teeth, unless of a very partial character, I do not advise. The gold is too conspicuous. Do not let your ambition run away with your judgment. Contour work is very easy at this part, and from a technical point of view we all admire it, but our art should be conspicuous in hiding itself. If a tooth is badly broken, I prefer rather to cut it off and pivot or crown it than to use gold. If not very badly broken away, and yet very conspicuous, I would advise white cement or gutta percha.

Anterior cavities in the canines should be filled as incisors are; but if distal they will generally have to be opened from behind, using a pit as a starting point on either side.

Between the bicuspid decay is exceedingly common. If they are mesial, they present no difficulties, as the excavation and subsequent stopping are readily done. It is advisable, however, unless the cavity is very small, to bevel or flare the opening, so that the gold will be carried well over the walls on either side and thus in a measure prevent the recurrence of decay. The crown portion should also project forward as much as the space will permit. This is called knuckling. So that the only parts in contact with the anterior tooth are at or near the cutting edge, thus preventing the crowding of food down between the teeth, a result that is sure to follow if a V-shaped space is left. You may, however, be unable to form this contour as you would wish, by reason of limited undercut; in a close articulation, stoppings that are quite well enough anchored for ordinary positions, are often bitten quite out by the great force of mastication.

When distal cavities of bicuspid occupy our attention, our principle of proceeding is quite altered. Owing to the indirect approach to the cavity, it is necessary for us to apply our force in a less direct manner. For this reason we generally use in these cases a matrix, either a thin piece of steel placed between the

teeth and wedged into position ; or a band matrix with a screw to draw the band into close contact with the teeth. The Ladmore-Brunton, already mentioned, answers the purpose admirably. The use of the matrix reduces the compound to a simple cavity, for remember we have long ago abandoned the filing of a V-shaped space between the teeth to make accessible a distal cavity, instead of which we now almost invariably drill into these approximal cavities from the crown. In doing this we make a simple cavity compound, but we gain far more accessibility than we lose in other ways. Thoroughly excavating under these circumstances is easy and certain, whereas by the old way it was difficult and uncertain.

Before placing the matrix in position, the cavity should be shaped so as to get, as far as possible, direct pressure against the edges. It is practically impossible to condense gold by any other than direct pressure. You cannot do so when the walls of the cavity are parallel with the instrument, as force applied in this way rather tends to draw the gold away from than force it against the walls. To some extent we get over the difficulty by using curved or corkscrew pluggers, directing the force, as applied by the mallet, by the hand holding the plugger. Still it is always preferable to use the direct force itself rather than change the direction by the fingers.

Where it is practicable, so shape the distal cavities in bicuspidis that they will be smaller across at the cervical wall than at the crown, trumpet shaped in fact. In this way you can get access and consequent solidity, but of course you have no anchorage. This you must get inside the vertical walls either by grooves, pits, or channels.

In regard to the cavities in molars, they are so various that it is hard to lay down any principle. Approximal cavities are treated as if they were bicuspidis, while crown fillings present no points of difficulty.

I need not remind you that the preparation of the cavity is governed by the material subsequently to be used in filling it. For cohesive gold you merely require the anchorages necessary to hold it in position, for you can build out in any direction. For tin and gold, or soft gold, you require nearly parallel walls, malleting from the distal wall forward. For amalgam try and avoid thin edges by removing the excess of the material, and not allowing it to go beyond the parallel walls ; but for the white cements or gutta percha



it is not necessary to do even this. There is a class of cavities that we have not mentioned, and that calls for considerable skill in the use of cohesive gold. I allude to erosions. The disease is very common, and gold seems to meet the requirements better than any other material. My plan of procedure is as follows: excavate all soft dentine, and undercut with a drill and wheel bur all or nearly all around; do not rely upon pits. Then, having placed the rubber dam in position (thick dam with a very small hole), I keep the rubber above the gums by a sharp two-pronged instrument, then fill with crystal gold. The essential is dryness, and this is readily secured if you make but one hole in the rubber and with the silk force up folds between the teeth, so that there is an excess near the gums.

(To be continued.)

### ON THE CURABILITY OF PULPLESS AND ABSCESSSED TEETH; MAINLY BY THE IMMEDIATE METHOD, WITH STATISTICS OF CASES.

*Being a Paper read before the Dental Section of the International Medical Congress,  
Washington, 1887,*

By GEORGE CUNNINGHAM, B.A., D.M.D., L.D.S.Eng.,

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THE principal work which I wish to lay before this Section, and that to which I attach the most importance, are the statistics. In presenting such a record of a large number of cases, it is possible for everyone to examine them in detail. I shall now hand round among the members copies of the actual records from which the tables are prepared, so that they may have an opportunity of examining them, and may be convinced that the figures, carefully compiled from these records, have a reliable foundation and basis. The work has proved of such a Herculean nature that I think I shall be excused for saying that I have not exhausted all the information derivable from the tabulated records, and that the present communication might be taken as an earnest of my sincerity and interest in the investigations. The relativity of the various teeth to the condition of being pulpless or abscessed is shown by these tables, but time will not permit of my entering on that subject now. The system on which the records were kept was embraced in a paper\* I read before the American Dental

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\* "A Suggested System of Dental Notation for the Use of Dentists in Recording Operations." Dental Manufacturing Company, London.

Society of Europe, and has been employed for several years with success by myself and others. I should like to observe that when these cases were recorded I had not the slightest intention whatever of preparing a paper on this subject. The large detailed tabulations are simply the exact copies of the everyday record of *each* and *every* case as it came under notice. From the attention which the Immediate Method has recently received in the *Cosmos* and other American dental journals, and from the disbelief with which Dr. Craven's paper has been received, I am more glad than ever that I felt impelled to tabulate the results of this method and place it before this Section of the International Medical Congress.

The troublesomeness, the tediousness, and the disasters attending the treatment of pulpless and abscessed teeth are only too well known. The literature on the subject was so very extensive, and the views expressed so very divergent, that a perusal of it was absolutely perplexing. Peculiarly interesting and severe cases had been reported in detail ; but no writer on the subject had yet given any general statistics illustrative of the results of ordinary practice. It would be only fair, however, to mention one exception, more especially as it was from the conviction carried by the clinical notes of these cases that I was induced to adopt the present line of treatment. It mainly arose out of a criticism of his book on "Dental Surgery" that Mr. A. Coleman prepared a paper which was read before a meeting of the British Dental Association, on October 14th, 1882. It was a paper on the treatment of "dead teeth" (as he called them) by an antiseptic process. He says :—

"Such cases may be briefly described as teeth in which the whole, or nearly the whole, of the dental pulp has lost its vitality, and where the adjacent dentine, either through decomposition of the contents of the dentinal tubuli, or saturation with the septic fluids from the decomposed pulp, has become putrid and offensive, and, according to the degree of its putrescence, coupled with the state of health of the individual, more or less affects the cementum and its contiguous vascular membrane."

Mr. Coleman, in describing the process which he recommended for the generality of such cases, says :—

"After removing all the softened dentine and the contents of the pulp cavity, but not those of the fangs, and well syringing and drying, carbolic acid on cotton is placed in the pulp cavity, and left there for a few minutes, the time being generally occupied whilst

preparing the filling. This latter being made ready, the carbolic acid is then removed, and the cavity again dried, and over the fine cavity or cavities, as the case may be, is placed a small disc of stout writing paper moistened with carbolic acid, on one side of which has been taken up the twentieth to the fifteenth of a grain of arsenic, this side being applied to the fang cavity. Over this zinc-oxychloride, as usually mixed for a filling, is placed as much as nearly or quite fills up the pulp cavity; and when this has set, the remainder of the cavity may be filled with any suitable filling. In the case of molars, and where it may be supposed there is any possibility of a second application of arsenic being necessary, I fill temporarily with gutta percha."

Mr. Coleman then proceeded to give the records of a certain number of cases; and it was from those cases being reported so fully that I had the confidence to adopt that operation. I must explain that my practice is in a university town, and I have therefore a very peculiar practice—a constant succession of patients who come and then disappear. It must not be assumed that these patients necessarily went away because of the ill effects of my treatment, but because they removed to other spheres on the conclusion of their academic career. I purpose making an effort to complete the history of those cases, and to get a much fuller report as to the cases which have not been reseen. As these proceedings will be reported in the English journals, I appeal to the profession to assist me, when possible, in filling out the history of any case I have reported, especially by sending notice of my failures. The intractable nature of many patients had led me to endeavour to get over the difficulty, especially with these troublesome students, by treatment at the one sitting; because otherwise, before the dressings had come to an end, the patient would have disappeared. I could not make up my mind to continue what I considered at best a somewhat filthy kind of practice. I was too strongly imbued with the training I had received in this country not to appreciate the fact that, contrary to what Mr. Coleman advised, before I did anything I should remove the contents of the pulp canals more or less thoroughly, and that any extra expenditure of time which this operation demanded would be well repaid. The consequence was that I endeavoured to make a compromise between the two plans.

I may say that in many instances in my practice the pulp



canals have never been completely filled. A certain percentage of our fellow-practitioners, as was known from their own statement, did things perfectly; but a great number did not do things perfectly. I belong to the latter category. By referring to the diagram which I have drawn upon the black board (see p. 17) it may be seen that when I do not know to what extent the root or roots of the tooth were filled, I try to form some conception of it by means of a similar diagram in the case book. It is only in very rare cases, where the root canal is unusually patent, that I have found it necessary to extend the cleansing process to the immediate neighbourhood of the apex of the root. All root canals which were found too small to admit a fine nerve bristle were left untouched. When we remember the frequency of curved and other irregular formations of the ends of the roots, it might be well to recognise the fact that the operative difficulties of complete removal to the very apex must often be insurmountable, and that from the danger of perforating the root at some other spot than the apex there may be a danger in over-thoroughness of excavation.

When I was on the Continent last year visiting the German dental schools, I had the opportunity of inspecting the interesting school of Leipsic under the care of Professor Hesse. We very quickly found out that each was anxious to communicate something of importance to the other, and that was as to the Immediate Treatment of teeth. Professor Hesse was carrying out that system in his school, and was doing so with success.

The present record of cases, treated by the immediate method, went back as far as the earliest part of 1883, soon after the publication of Mr. Coleman's paper. Before discussing the record, I would call your attention to one case in particular. I was going to operate for a personal friend, and having put on the rubber dam, I had just removed a zinc phosphate filling from the superior right second bicuspid, thereby exposing the putrescent pulp, and was about to clear out the carious cavity, when a very urgent message came to me from another patient. The gentleman on whom I was operating said he would take it as a favour if I would attend to the message and let him go. I did so, after removing the rubber dam, without even inserting a dressing, so you can imagine my surprise when he appeared next day with as big a face as any I have ever seen in the whole course of my professional experience. If a filling or even a dressing had

been inserted, I would have ascribed this condition to the occluding and shutting up of the putrid matter. As it could not possibly be due to that, this case seems to indicate that the sudden development of a so-called blind abscess into an acute one is not necessarily due to the occlusion of the root canal, nor to the passage of putrid *débris* beyond the apex of the root.

As my friend was an eager experimentalist, he encouraged me to carry the test of the immediate method further than I had hitherto ever dared. On Nov. 8th, 1884, the second day after the removal of the stopping, while the abscess was in this acute stage and the face much swollen, I applied the rubber dam, cleansed the cavity and root canals, inserted a minute dressing of arsenious acid and oil of cloves, and filled each root-canal with zinc oxychloride, finishing the main cavity with Ash's phosphate cement. After removing the rubber dam, the gum was lanced. The case progressed favourably, and the tooth has never given any subsequent trouble.

The various agents employed under the Dressing Method, were eucalyptus oil, the same combined with iodoform, creosote and iodoform, oil of cloves, carbolised resin, tincture of aconite, and oxychloride of zinc. I have a record of 122 teeth so treated—the majority of them (seventy-four) having been treated with eucalyptus oil or with eucalyptus and iodoform. The number of extractions which I was obliged to make in those cases is six—a percentage of 4·918. I do not claim that as the total percentage of teeth extracted under the Dressing Method, because I am sure that there is a certain number of cases the further history of which has been lost, and which, no doubt, includes several extractions. But at the same time that figure, small as it is, will be sufficient for the purposes of comparison with the results of the other method. The next thing which has been noted is the number of subsequent occasions when the patient had returned, generally in the course of having other teeth treated, complaining of slight inflammation of the periosteum. This number is thirty-six, or a percentage of 29·5; while the number of subsequent swollen faces and abscesses is thirty-two, or a percentage of 26·2. The next point of importance noted is the number of permanent stoppings inserted at the time of filling the root canals. It was found that in the years 1883-4 there were only two such out of thirty-eight cases, or a percentage of 5·26.

In the course of the Immediate Method, the first dressings employed were arsenious acid and oil of cloves. The modification of Mr. Coleman's plan, which I adopted, was simply to take the merest shred of cotton wool on a fine nerve bristle, the difficulty being to get this shred small enough. I am ready to admit that even this amount of cotton wool was a disadvantage, but I had not found anything which would do better as a vehicle. Having dipped the wool in oil of cloves, I simply touched the end with the smallest possible portion of arsenious acid, and carried it up as far as I thought it safe to go in the direction of the apex of the root. Finding that that was occasionally an unsatisfactory method in other hands, I feel that I ought to give a warning and a caution about it. I have the incomplete and careless records of one assistant, who acted as *locum tenens* for a time—an otherwise able man, who contributed to the literature of the profession, and who thought he knew all about this treatment at once. If I were to collate the extractions and the extensive necroses which followed that assistant's treatment, the members would certainly condemn this use of arsenious acid; but, in the proportions which Mr. Coleman had advised as quite permissible in the pulp cavity (a few milligrammes), the amount was so small that no deleterious results followed. It was evident that too large a proportion of arsenious acid had been used, and in several cases I found that the root had been perforated and the dressing forced beyond the opening. The results which followed were only what might have been expected from such careless and reckless manipulation. It was impossible to make out a record of the work of the *locum tenens* above referred to, as he had failed to inscribe the necessary data, evidently thinking such a tax on his time was superfluous. In none of the cases treated by my brother or myself has there been, so far as I know, a single case of loss of a tooth due to an overdose of the arsenious acid.

Not from any failure by the employment of the first method, but in an endeavour to adopt a more exact method I next employed a solution of arsenious acid in glycerine. By careful and prolonged manipulation over a sand or water bath, I made a 1 per cent. solution, which answered, admirably, and has been very favourably commented on by several other practitioners who have used it. My brother got a chemist to make up for him a solution of arsenious acid in alcohol, with oil of cloves, which formed a 2 per cent.



solution.\* After a time it was desired to test the efficacy of bichloride of mercury in this method, and, therefore, a solution of one in 1,000 had been employed in forty-five cases, and another of one in 100 in seventy-five cases. The 1 per cent. solution of arsenious acid had been employed in 165 cases. Eucalyptus oil, I am confident, would also prove efficient; while eucalyptus oil in combination with iodoform and oil of cloves had been used in a few cases. I have also tried dressings of a mouth wash, consisting of thymol, benzoic acid and tincture of eucalyptus in water, which was published as emanating from Professor Miller, of Berlin, in one or two cases.

In order to prevent possible erroneous conclusions from these facts, it may be well to state that the decision to employ the mercuric chloride in place of the arsenious acid was not arrived at from any dissatisfaction with the latter, but from a recognition of the enormously greater power of the former over the latter as an antiseptic and germicide. Indeed, whilst I was trying the mercuric chloride, the use of arsenious acid was continued both by my brother and an assistant.

The mode of use of the mercuric chloride is very simple. After the preparation of the root canals, they are well syringed out several times with the 1 per cent. solution. During the preparation of the instruments, the zinc oxychloride and the cotton wool dressings for carrying the latter well into the root, the canals are left soaking in the solution. The excess only is then absorbed, thus leaving the walls of the canals moist, a matter of some importance, as if they are wet the zinc oxychloride will penetrate further into the finest canals than if they are dry. The addition of mercuric chloride to the first oxychloride mixed in this way is no disadvantage, but is possibly unnecessary.

In the absence of any generally recognised scientific classification of pulpless and abscessed teeth, these cases have been tabulated under three distinct conditions, viz. :

(a). Those where the pulp was removed at the time in a fairly healthy or non-putrescent condition.

*B.
Acid, Arseniosi . . . . . gr. ii.
Sp. Vini Rect. . . . . 3i.
Ol. Caryoph. . . . . 3i.
Misce.

If the arsenious acid does not dissolve at once, it will do so in time. Gentle heat over a sand bath will promote solution.

(b). Those where the pulp, or what remained of it, was in a putrid state, including, therefore, all cases of so-called blind abscess.

(c). Those where a fistulous opening indicated with certainty the presence of an apical abscess.

Out of a total number of 512 teeth treated by the Immediate Method, the total number of known extractions was three. Two of these had been marked at the time before beginning the operation as "forlorn hope;" and one of them was removed partly for artificial work. The tooth was loose. My assistant had made a very pardonable mistake. It was a left superior bicuspid with that rather uncommon abnormality a bayonet-shaped root (see fig. 9). After its extraction it was found that in drilling out the root canal the instrument had perforated the root just at the bend, and the arsenical clove-dressing was found protruding through this perforation, thus setting up a chronic periodontitis, whether by acting as a mechanical or a chemical irritant, but not improbably as both, is uncertain. One tooth which had been extracted has not been included in this list, for the following obvious reason. On 19th November, 1884, my brother treated and filled with the arsenious acid and oil of cloves and phosphate cement a right upper lateral incisor for a lady student at Newnham College, and on 5th February, 1885, he filled the tooth permanently with gold. On the 25th June, 1886, whether by overstudy, by excess of exercise, or from what cause we know not, the hitherto absent right upper canine tooth was erupted directly over the lateral incisor. It therefore became necessary to sacrifice one tooth or the other; and it was deemed better to extract the lateral incisor. Under these circumstances it would be an error to include that extraction as coming among these cases.

The next point to which I would call your attention is the number of subsequent cases of slight periostitis calling for treatment under this immediate method. My record shows six cases as against thirty-six under the dressing method, or a percentage of 1·152, as against a percentage of 29·5. Under the Immediate Method the number of cases of swellings and abscesses treated subsequently was five, or a percentage of ·976 as against thirty-two, or a percentage of 26·2. I do not ask members to take these percentages as absolutely exact; but as they were calculated from tables in which both methods had been recorded with equal faith-

fulness, so far as statistics went, they represented faithfully the relative advantages of these two distinct methods of treatment. There was no partiality or favour shown to the one system more than to the other. Under the dressing system in 1883-4, only two teeth out of thirty-eight, or a percentage of 5.26, had been permanently stopped at the time of filling the root canals, whereas under the immediate method in 1886-7 sixty-one teeth out of 150, or a percentage of 40.66, had been permanently filled at once. That surely showed in the most emphatic manner the gradual conviction to which I have come to as to the results obtained by the Immediate Method in my practice. The rubber dam was recorded as having been used in 200 out of 270 cases, or in about 75 per cent. for the Immediate Treatment, and in 52 cases out of 153, or about 33 per cent. for the dressing method. In order to give some idea as to the number of cases which I have seen again, my records are not fully made up; but in one case book, out of a total of 114 cases, 70 of them had been seen again; in another, out of 109 cases, 66; and in a third, out of 49 cases, 40. I believe, therefore, that the extractions under the Immediate Method (taking into consideration the number of cases seen again, and making a liberal allowance for the patients who have consulted some other practitioner) have not exceeded 2 per cent. Making a still larger allowance for the patients in pain who have sought other advice in cases of subsequent acute periodontitis, I should say that the number was about 3 per cent., but possibly less.

The success of the operations seemed mainly to depend on the old axiom, *Sublata causa, tollitur effectus*. No observant practitioner can have failed to notice the inherent curability of numbers of abscessed teeth. Who has not noticed the frequency of cicatricial tissue marking the existence of former fistulous tracks, even where the putrefactive contents had been allowed to remain? It was to this inherent property of spontaneous curability that we look for the relief and cure of all the injurious conditions arising from a putrescently diseased pulp. In my opinion the best mode of sterilization for infected dentine is excavation; therefore, I use the nerve drill freely where the presence of micro organisms is suspected. By removing the greater part of the diseased tissue, even although the naked eye might not be able to detect the existence of any diseased process, accompanied by micro-organisms, they might fairly anticipate that the strife between diseased processes and



healthy action would come to an end. If the general condition of the individual were good, such a case would probably have a favourable termination. Is it not possible that the pathogenic functions of micro-organisms in these conditions are exaggerated? It should be remembered that many of these organisms found in the mouth and tooth cavities were non-pathogenic. Certainly, a large number, if not the majority of recorded cases, could be treated by the removal of all fairly accessible degenerated pulp tissue and infected dentine; and that, with the complete occlusion of the cavity, would result in a cure (unless there was a distinct discharge of pus from the apex, or unless a fistulous track was present).

The impossibility of diagnosing with any absolute certainty the existence of an abscess sac at the apex of the root had to be recognised. On the occlusion of the pulp canal or canals of such a tooth, a slight amount of subsequent inflammation should be regarded rather as an aid than as an obstacle in the complete removal of the existing conditions, while a more acute inflammation would ultimately promote the complete absorption and removal of any old existing inflammatory product. In a large number of cases it is probable that merely a quiescent condition is established. The pain and constitutional disturbances arising in the more severe cases of inflammation might be successfully combated by the employment of local counter irritants, and depletion, aided by aperients and the internal administration of some such drug as quinine, which possessed the power of diminishing the activity of the inflammatory process—whether by checking the activity of the cells, by diminishing the exudation, or by reason of the oxidation process, I do not know. But I can vouch for its extreme use and benefit in those conditions; and I can also vouch for the subsequent gratitude of patients (when they got into a state of despair) to the dentist for such remedy, instead of meekly yielding to the not unnatural desire for extraction.

In the majority of cases the inflammatory process was so slight as to pass unnoticed, or was not excited at all; and yet the existence of an abscess sac might be assumed as being present in many of them. In most cases it might be anticipated that either the walls of the sac adhered and became united together, or that the contents gradually dried up and became converted into a caseous mass, in which state it was absolutely innocuous and perfectly harmless, remaining where it was.

In the very small number of cases where the diseased condition persisted, resort might be had to the heroic treatment by the burring of the necrosed part of the root and alveolus, or by the injection of aromatic sulphuric acid into the diseased part. In several cases, where extensive excavations of the alveolus had occurred, it might be assumed, from their healing so rapidly, that granulation tissue had formed in the interior of the sac, followed by a gradual contraction of the newly formed tissue, converting it into a small knot of old cicatrized fibrous tissue.

I believe that the operation called rhizodontropy and the insertion of a drainage tube within the tooth were unnecessary. Rhizodontropy might afford a temporary and convenient relief to the patient, and (should I say it?) to the busy operator; but in several cases I have seen it result in a renewal of the abscess, or in the loss of the tooth.

Finally, no matter how much these suggestions as to the pathological conditions of pulpless and abscessed teeth and the changes produced by treatment might be subject of debate, there could be no question as to the silent eloquence of the facts showing the results of treatment as set forth in the statistics of cases which I have presented. Contrasting, then, the relative advantages of the dressing method as compared with the Immediate Method of treatment, I am led to the following conclusions:—

1st—That under the Immediate Method there were fewer extractions and failures.

2nd—That there were fewer subsequent attacks accompanied by swellings and acute abscess, and therefore the Immediate Treatment was attended with less pain.

3rd—That it required a considerably less expenditure of time on the part of both the patient and operator, the average time of treating and filling such teeth being considerably under an hour.

4th—That in consequence of these considerations, we were able to treat and were able to save more desperate cases, many of the cases mentioned in the record having large perforations of the roots, while others had been already condemned by other practitioners as utterly hopeless.

5th—That method, rather than medicine, had a good deal to do with the results, and that probably the operation would have succeeded equally well in a very large number of cases without any medicine whatever.

6th—That, from the difficulty of diagnosing such cases, it is better to conduct every operation with all antiseptic precautions.

7th—That casualties, such as perforation of the root, under the Immediate Method of Treatment, had been fewer, probably because of the less complete removal of the contents of the root canals.

Conscious, as I am, of the incompleteness of the record in some respects, I hope at some future time to complete the work, and meanwhile present a few actual tracings from my case book, some of them showing desperate cases where I scarcely anticipated success, and which I could only treat, either in justice to my patient or with satisfaction to myself, by the Immediate Method.

STATISTICS OF THE CURABILITY OF PULPLESS AND ABSCESSED TEETH BY THE DRESSING AND THE IMMEDIATE METHODS, 1882-87.

	Total Number of Cases.		Percentage.	
	Dressing.	Immediate.	Dressing	Immediate.
All root canals cleansed, treated antiseptically, and filled with oxychloride of zinc ( <i>in most cases</i> ).....	122	512	100	100
Cases requiring subsequent treatment:—				
1. For slight periostitis ..	36	3	29·5	1·15
2. For swelling or abscess	32	5	26·2	0·97
3. By extraction*.....	6	3	4·91	0·58
Cases compared in equal periods of .....	1883-84	1886-87	1883-84	1886-87
Total Number.....	38	150	100	100
Number of these in which permanent fillings immediately followed .....	2	61	5·26	40·66

\* These figures do not include all the extractions under either method, as no doubt others were extracted by other hands, but the results are fairly comparable since the conditions were identical in both periods.





FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.

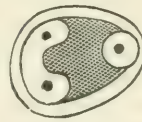


FIG. 8.

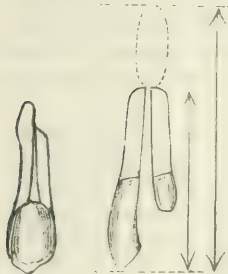


FIG. 9.



FIG. 10.

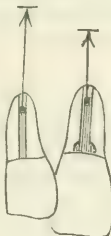


FIG. 11.

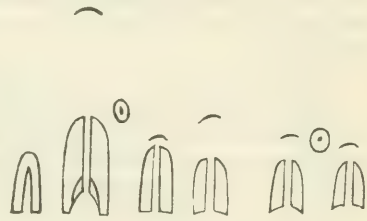


FIG. 12.

## EXPLANATION OF TRACINGS, WITH NOTES FROM THE CASE BOOK.

FIG. 1.—H.D.—28. xii. 85.—L.U.M<sub>2</sub>.—Three pulp canals, arsenicated glycerine dressings and zinc oxychloride filling; cavity filled phosphate cement (Ash); palatal canal sensitive at apex; owing to irregular disposition of roots, the anterior canal difficult of access.

FIG. 2.—H.D.—20. xii. 86.—L.U.M<sub>1</sub>.—Removed old fillings, gold and amalgam—anterior buccal canal Hg Cl<sub>2</sub> % application, filled zinc oxychloride—remainder of pulp apparently calcified; no trace of other canals. 28. xii. 86.—Cavity filled tin gold below, gold above.

FIG. 3.—H.D.—17-18. xii. 86.—R.U.M<sub>1</sub>.—Removed old filling of amalgam and gold; canals filled with cotton; done about '81; about one hour occupied in removal of the foul dressings; anterior buccal canal perforated (not shown in Fig.); bleeding. Hg Cl<sub>2</sub> % application, canals filled zinc oxychloride; cavity, amalgam Flagg's submarine below, contour above.

FIG. 4.—Miss S.—30. xii. 85.—R.U.M<sub>1</sub>, M<sub>2</sub>.—Two canals dressed with arsenicated glycerine and filled zinc oxychloride; difficult of access; distal buccal canal not discoverable; cavities filled with amalgam, copper (Roger's) below, Fletcher's contour above.

FIG. 5.—H.J.K.—7. xii. 85.—L.L.M<sub>1</sub>.—Removed old filling amalgam over large cotton wool dressing in pulp cavity; mesial canal, small; distal, large, open at apex, bleeding; both canals dressed with arsenicated glycerine, and filled with zinc oxychloride; cavity filled with Fletcher's standard amalgam.

FIG. 6.—H.J.K.—7. xi. 85.—R.L.M<sub>1</sub>.—Mere shell; very difficult case; roots almost separated with a median perforation where they join; both canals dressed with arsenicated glycerine and filled with zinc oxychloride. 10. xi. 85.—Considerable pain and swelling, treated by application of pepper bag. 28. xi. 85.—Inserted How screw in distal canal, and cavity filled with amalgam, copper (Roger's) below and Fletcher's contour above. Platinum matrix—perforation protected by layer of thick gold foil.

FIG. 7.—Miss N.—18. ii. 86.—R.L.M<sub>2</sub>.—Shell; removed very putrid contents of canals; two distal and one mesial, canals dressed with arsenicated glycerine and filled with zinc oxychloride. 2. iii. 86.—How's screw in distal canal and cavity filled with amalgam, copper (Roger's) below and Eckfeldt standard alloy above.

FIG. 8.—Miss N.—24. v. 86.—R.U.M<sub>1</sub>.—After removal of hypertrophied gum by continued dressings of acid nitrate of mercury; palatal root quite separated from the two buccal; canals dressed with arsenicated glycerine, and filled zinc oxychloride; three How screws, the intervening gum being protected by platinum foil perforated for the passage of the screws; contour amalgam filling (Eckfeldt) built up round screws; impossible to apply the rubber dam.

FIG. 9.—Miss A.—21. v. 86.—L.U.B<sub>2</sub>.—Canal dressed with arsenical glycerine and filled with zinc oxychloride; phosphate cement (Ash) lining; cavity filled amalgam, Fletcher's contour. 17. vii. 87.—Tooth loose, and in consequence of other teeth absent, artificial denture required; it was extracted. On examination the dressing was found to be protruding from a perforation of the root canal, owing to its irregular shape.

FIG. 10.—H.M., 21 iv. 87.—R.U.C.—On opening into pulp cavity and passing probe into lower part of canal dry with strong smell. On carrying the probe further it passed into the abscess sac, as its withdrawal was followed by a considerable flow of thin greenish yellow pus. After drying the flow up with cotton wool and reaming out the canal largely syringed with Hg Cl<sub>2</sub>  $\frac{1}{100}$ , and filled with zinc oxychloride mixed with Hg Cl<sub>2</sub>  $\frac{1}{100}$ . Cavity filled temporarily with gutta percha. 26. v. 87.—Large contour gold filling. By measurement the apex of the root was found to be  $\frac{1}{8}$  in. from the cusp, while the probe could be easily passed to  $1\frac{3}{8}$  in., the difference in these measurements showing one diameter of the excavation at the end of the root. No subsequent inflammation or the least sensibility to pressure.

FIG. 11.—M.M.P.M.—19. vi. 86.—R.U.I<sub>1</sub>, I<sub>2</sub>.—Old roots under a plate worn for years; fistulous opening on gum; prepared roots dressed Hg Cl<sub>2</sub>  $\frac{1}{100}$ . 23. vi.—Re-dressed roots Hg Cl<sub>2</sub> after syringing; abscess suppurating; thick pus; syringing up the canal of either tooth it descended by the other.

24. vi.—Similar treatment. 28. vi.— $\text{Hg Cl}_2 \frac{0}{100}$ .—Dressing, and canals filled with zinc oxychloride. 10. vii.—Fitted double porcelain crown bridge, owing to weakness of the lateral incisor, with phosphate cement (Ash). 20. vii.—Syringed  $\text{Hg Cl}_2 \frac{0}{10}$  through the fistulous opening. 1. x.—Aromatic sulphuric acid dressing, pus discharging. 15. x.—Fistulous opening closed. 27. x. 86.—Double crown loose; refixed with phosphate cement (Rostaing). The measurements on diagrams represent the actual depth of the excavation in the bone at the apices.

FIG. 12.—Miss C.—R.U.I<sub>1</sub>; I<sub>2</sub>.C., and L.U.I<sub>1</sub>, and I<sub>2</sub>.—Two fistulous openings; old roots under a plate for about fourteen years. 19. iv. 87.—Prepared roots.—5, 6, 7, 8 dressed  $\text{Hg Cl}_2 \frac{0}{10}$ ; 9 and 10 dressed arsenical glycerine, gutta percha temporary fillings in all of them; erupting abscess over 10 and pus on pressing [the apex. 20. 22. 26. iv.—Acute inflammation and pus discharge.—Iodine and aconite applications with pepper bag. 28. iv.—Inflammation and swelling almost gone. 4. v.—Roots 9 and 10 dressed arsenical glycerine and filled with zinc oxychloride. 10. v.—Roots 5, 6, 7, 8 dressed with  $\text{Hg Cl}_2 \frac{0}{10}$ , and filled with zinc oxychloride mixed with  $\text{Hg Cl}_2 \frac{0}{10}$ . The curves above the apices represent the depth to which the probe passed in each case beyond the apex, as ascertained by actual measurement. 13. v.—Roots 5, 7, 8, 10 faced with amalgam (Coterell), and fitted bridge in three parts by ferrules on 6 and 9, and pivots on centre part, passing within the ferrules into the root canals. The pivots and ferrules were fixed with phosphate cement (Eisfelder). Both fistulous openings healing over. 19. vii.—Refixed parts of bridge as before.

NOTE.—All these cases are known to be doing well at this time—20. xii. 87.—with the possible exception of the cases represented in Figs. 5 and 6, which have not been seen again recently.

## ON THE COMBINATION OF TIN AND GOLD AS A FILLING MATERIAL FOR THE TEETH.

By W. D. MILLER, M.D., Ph.D., &c.,

Professor in the Dental Institute of the University of Berlin.

(Being a series of Lectures delivered in the Institute, and translated from the German by Miss St. George Elliott.)

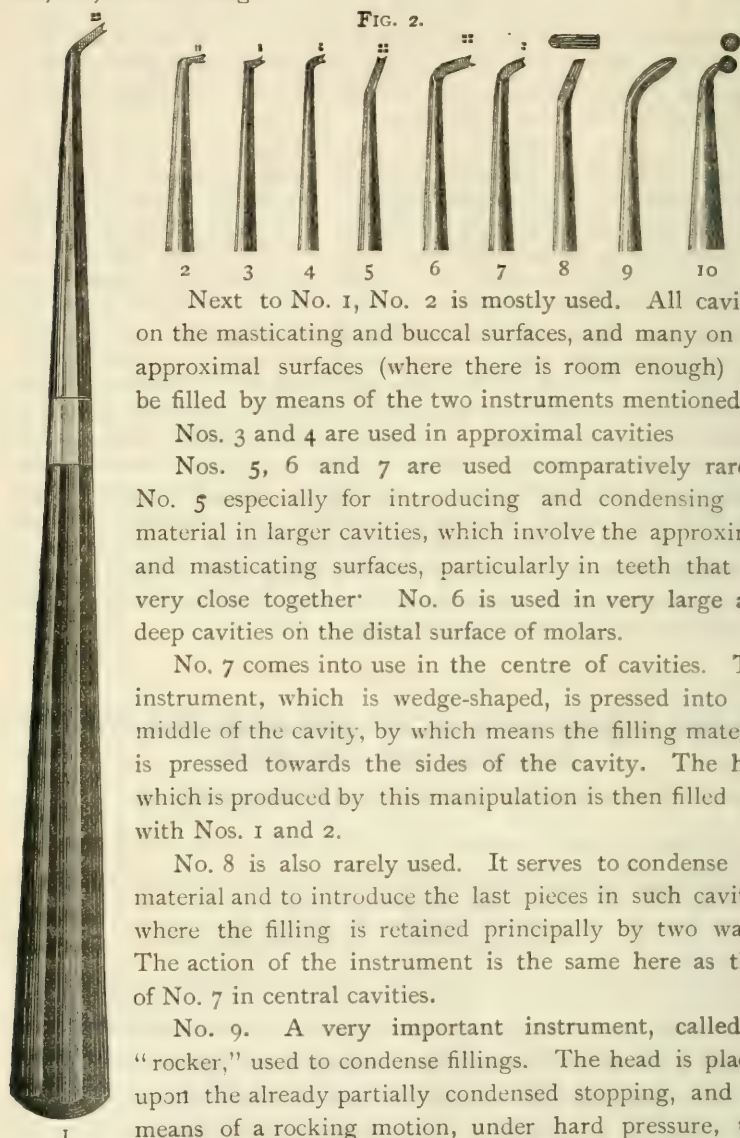
(Continued from page 535, Vol. VII).

### FILLING TEETH WITH TIN AND GOLD FOIL BY HAND OR Mallet.

ONE can put in a filling of tin and gold with almost any instrument, a blunt or broken excavator, &c.; but there are special forms which appear to me eminently suitable for stopping with tin and gold, and these I use in my practice. They are shown in Fig. 2, and are all intended for hand pressure. When it is desirable to mallet the filling, as in the cases mentioned below, the ordinary pluggers for cohesive gold may be made use of.



No. 1 is a sort of universal plugger. With this instrument I begin nearly every filling, and with it and No. 2 I complete the great majority of the fillings.



Next to No. 1, No. 2 is mostly used. All cavities on the masticating and buccal surfaces, and many on the approximal surfaces (where there is room enough) can be filled by means of the two instruments mentioned.

Nos. 3 and 4 are used in approximal cavities

Nos. 5, 6 and 7 are used comparatively rarely. No. 5 especially for introducing and condensing the material in larger cavities, which involve the approximal and masticating surfaces, particularly in teeth that are very close together. No. 6 is used in very large and deep cavities on the distal surface of molars.

No. 7 comes into use in the centre of cavities. The instrument, which is wedge-shaped, is pressed into the middle of the cavity, by which means the filling material is pressed towards the sides of the cavity. The hole which is produced by this manipulation is then filled out with Nos. 1 and 2.

No. 8 is also rarely used. It serves to condense the material and to introduce the last pieces in such cavities where the filling is retained principally by two walls. The action of the instrument is the same here as that of No. 7 in central cavities.

No. 9. A very important instrument, called a "rocker," used to condense fillings. The head is placed upon the already partially condensed stopping, and by means of a rocking motion, under hard pressure, the material becomes at the same time condensed in the centre and pressed against the edges, by which means the best possible adaptation is secured.

No. 10. A flat wedged-shaped instrument, with a slightly concaved surface ; is used in approximal cavities as a wedge between the stopping and the neighbouring tooth, partly to condense the material and partly to create a lesser intervening space for an ordinary polisher or for strips of sandpaper, &c. All pluggers are four-sided, in order that they may be used laterally in condensing.

The fundamental principle in stopping teeth with tin and gold is exactly the same as in filling with non-cohesive gold. Most of the material is pressed in place with the side of the instrument and pushed with some force towards the walls of the cavity, projecting very considerably over the entrance to this. Care must be taken that the cavity is not filled from the bottom, but from the sides, and that the edges are covered with an excess of material.

In Figs. 3—6 I have endeavoured to present to you the process used in the introduction of a simple tin and gold stopping. In the first of these you will see the mode of filling simple cavities on the masticating surface. The end of the roll is placed with the pliers in the cavity and pressed with the side of instrument 1 or 2 against the distal wall of the cavity ; in this position it is held, if necessary, with an instrument in the left hand. The point or side of the plugger is then laid upon the roll at a point about  $\frac{1}{2}$  or  $\frac{3}{4}$  inch from the end, and this point carried to the bottom of the cavity, making a fold which protrudes considerably above the orifice of the cavity (see Fig. 3). In this way one fold after another is condensed against the distal wall till the cavity is half or two-thirds full, when the material may be condensed against the mesial wall, leaving at least a hole near the middle of the filling, which is to be filled out with pellets about  $\frac{1}{4}$  or  $\frac{1}{2}$  inch long. The projecting material is then "collected" and pressed into the cavity with instrument No. 1, 2 or 6, farther condensed with the rocker No. 10, and finished as I shall describe below.

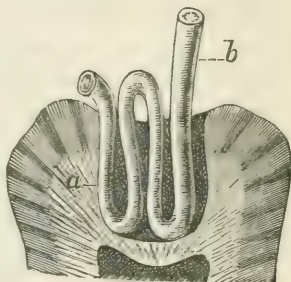


FIG. 3.

The cavity should not be allowed to fill up directly from the bottom, nor should we begin to condense the material towards the bottom until a sufficient quantity has been placed in the cavity to insure a flush filling. A filling which has been allowed to take the

shape represented in Fig. 4 may sometimes be completed by driving a wedge-shaped instrument into its centre, in this manner spreading the material until the walls are covered with an excess, and then filling the hole in the middle. Usually, however, it will be better to remove the faulty filling and begin again. Such a circumstance happens only to the beginner.



FIG. 4.

You may also begin by placing short sections of the roll, called pellets, in the cavity, using deeply serrated pluggers. I emphasise the fact again that these pluggers must not be round but four-sided. The material is taken up with the point, as illustrated in Fig. 5, and packed with the side of the instrument into the cavity ;

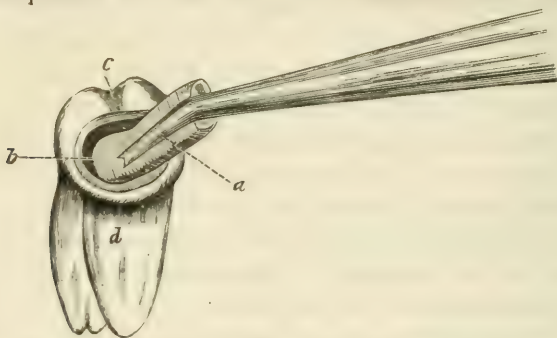


FIG. 5.

then it is pressed with this side surface towards wall *a*. In this way two or a number of pellets may be packed against the starting wall *a* until the cavity is about half full, and then the side *b* of the cavity may be stopped in the same manner, or the pellets may be placed alternately on opposite sides, as I have sketched in Fig. 10, or we may begin at any point (say *a*, Fig. 4), and place the pellets around the cavity in the direction *a, c, b d*, or *a, d, b, c*, in this way, gradually diminishing the size of the cavity (see Fig. 12) until at last we have only a small hole in the centre.

It is only after so much material has been inserted and becomes secure in the hole by counter pressure that the point of the plugger is used for the condensation of the materials towards the sides.

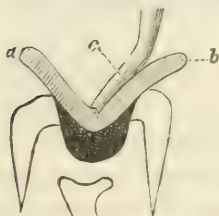


FIG. 6.

The pellets work admirably when they are cut into pieces about three times the depth of the cavity. In this case (see Fig. 6), the pellets are taken up in the middle and this part pressed into the hole with the point of



the instrument, so that both ends project over the opening of the cavity. If you have two or three pellets in the cavity, press them towards the walls and bottom of the same. When the filling has reached the stage depicted in Fig. 7, place the "rocker" (Fig. 2, No. 10) upon the centre of the stopping, and with a see-sawing or rocking motion and rather high pressure push the material towards all the walls of the cavity. The hollow which is thus caused in the centre is filled up with pellets of tin and gold. Then the projecting material is pressed into the cavity with one of the instruments 1—6; condensed again with No. 7 and now the filling is examined for soft places by means of a pointed instrument. If a soft place is apparent, place the point of one of the instruments, 1, 2 or 5, upon it, and with a vibrating motion of the hand, sink the instrument, if possible, to the bottom of the cavity and then push the tin and gold by a side motion of the instrument towards the wall. The aperture this occasions is stopped either with tin and gold or with gold pellets, and the filling is finished in the manner we shall describe hereafter.

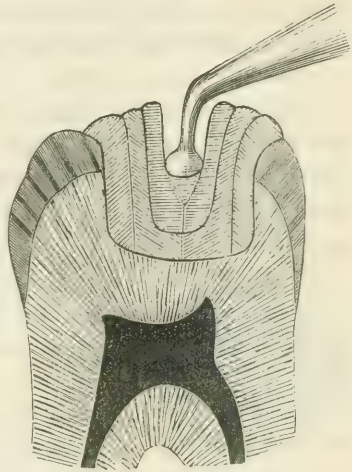


FIG. 7.

If the cavities are too small to allow of the use of the "rocker" in condensing, apply for the same purpose a suitable plugger with a broad surface (No. 1, 2 or 6). Set this upon the centre of the filling, sink the point of the instrument under heavy pressure, always with an oscillatory motion of the hand as near to the bottom of the cavity as possible, and then continue as I have directed in the previous paragraph.

For final condensation in such small central cavities, I sometimes also use a fine, rather tapering plugger, which I drive into the middle of the filling with a mallet, a practice by means of which the material is well and quickly pressed against the sides of the cavity.

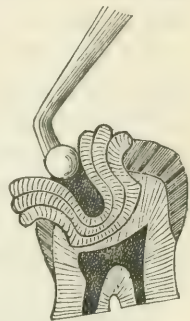


FIG. 8.

It is somewhat more difficult to fill compound cavities embracing (as in Fig. 8) the masticating and approximal surfaces of the molars. You will endeavour, if possible, by cutting away the corner of the masticating surface, to convert this into a central cavity.

The cavity may then be filled with either rolls or pellets in the manner illustrated in Figs. 3—6.

It is rather a complicated matter to fill with tin and gold if caries has destroyed the crown of a molar, central and approximal. Here also it is wise to renounce at the beginning the making of a complete contour (Fig. 9 *c*). The walls must be sloped and the cavity well undercut at *a* and *b*. You will commence by filling the

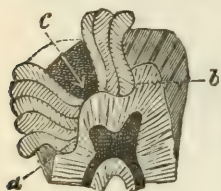


FIG. 9.

approximal part of the cavity *a*, and laying the pellets in the same position in which my sketch has placed them. Then part *b* will be stopped from the masticating surface until the pellets approach the approximal portion of the filling. In the direction of the arrow *c*, both parts of the stopping are pressed in opposite directions, condensed against walls *a* and *b*, and the finishing touches are added.

The preparation and filling of approximal cavities in bicusps and molars which do not open towards the masticating surface requires a great deal of skill on the part of the operator. Where the decay is not extensive, and sufficient space may be obtained by wedging or filling (which process is preferable each operator must decide for himself according to the circumstances), those cavities may be treated as simple cavities. In such case I almost invariably begin the operation by packing the material against the crevices well with No. 1 or 5, using here the end, not the side, of the instrument, and completing the operation with instruments 3 and 4, condensing with these or with No. 9, or even with a strong excavator.

When the decay is more extensive, involving the masticating or other surfaces, besides the approximal, we may either make a V-shaped separation or we may restore the tooth by a contour filling. Each operator must here again decide for himself which method he is to adopt. Contour fillings of tin and gold I usually cap with gold.

As I seldom use a matrix for these operations, after opening the cavity to be filled, I press into it a roll of cotton, usually from the

masticating surface in order to separate the teeth slightly and begin with the filling another day. I almost invariably open the cavity from the masticating surface and only cut from the labial wall what is absolutely necessary in order to attain firm anchorage. If, however, I must open and fill a large cavity from the labial surface, I proceed as follows:—

The head of the patient having been placed in a position that I can look directly into the cavity, I take No. 1, 2, 5 or a similar instrument—a short foot-stopper is frequently of great service—and fill with material, working towards the opposite (cervico-palatine) wall. Proceeding from this wall, the filling is gradually built up until the hole is about two-thirds full, when the cervical, palatinal and part of the masticating wall are covered, the buccal wall still being free. The aperture still existing can then be stopped with tin and gold. In case the filling is likely to show I generally cover the outside with gold. If the outer wall is very thin or the hole difficult of access, I take Abbey's non-cohesive gold foil in the form of pellets or strips, bring it to the neck of the tooth and build up towards the point or grinding surface, or I cover the outer wall of enamel with non-cohesive gold and finally fill the remaining space with tin and gold. If, however, the outer wall is hard and firm and the cavity accessible for the use of the mallet, I usually work with cohesive gold.

When the approximal cavity opens from the masticating surface, I treat it as I would a central, condensing tin and gold first against the cervical wall, using the neighbouring tooth as a matrix and using the mallet. When the cavity is about half filled the material should be packed not towards the cervical, but the lateral walls, leaving the last pellets to be inserted in the centre of the cavity.

I then finish with the flat, wedged-shaped instrument No. 9, which I drive or press in between the two teeth from the side, that is the neck of the tooth, using considerable force.

If on account of the extent of caries in the approximal surfaces, the teeth must be separated, it is equally easy to rest the pellets on the neighbouring tooth, or instead of that, you may make use of a matrix of thin sheet metal. This is often gladly done by some dentists, especially when the cavity opens too widely on the masticating surface. Experience has, however, taught us, that it is not always expedient to apply the matrix to the walls by means of wooden wedges or other appliances, but that it is far better so to place it in position that the filling material may extend beyond the cavity; it



can be condensed by using a wedged-shaped instrument No. 10 or a long, thin foot-stopper and a firm stroke of the mallet.

Much care is necessary in filling approximal cavities when they are large and very shallow. In this case I recommend you to cut rather deeply into the cervical part of the tooth, only undermining lightly the two side walls, and, when practicable, the masticating surface. If, however, in such a cavity, part of the enamel wall on the masticating surface has disappeared, so that the cavity has but three sides, the operation is somewhat more difficult. If a cavity of

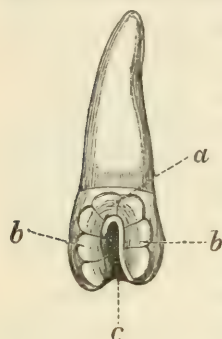


FIG. 10.

this nature (Fig. 10) is to be prepared, the material is first pressed towards the cervical wall *a*, thrown somewhat over this, and the two side walls *b, b*, are filled in the same manner, so that at last there remains only a fissure-like aperture or the hole *c*, between the two lateral points of the stopping. To fill this fissure, pellets of tin and gold or of non-cohesive gold foil are used and pressed into position by a flat chisel-shaped instrument (No. 8).

All the difficulties which I have brought before your notice as connected with the filling of approximal cavities increase as you recede from the incisors.

The operator who has not had considerable experience in the manipulation of tin and gold would have some difficulty in filling a cavity on the approximal surface of a second upper molar or a very flat, through-shaped hole in a first molar. But in stopping such cavities, tin and gold has singular advantages, particularly if the cavity is filled from the neck about one half or two-thirds full with tin and gold, and this is covered over with gold on the masticating surface and fixed in the way I shall endeavour to explain at the end of my discourse.

It still remains for me to make a statement in regard to the filling of cavities on the labial and buccal surface of the teeth. As tin and gold takes a gray or black colour, I have here in mind principally cavities in buccal surfaces of bicuspid and molars, and particularly such as extend under the gums. Here, where it is only with much trouble and difficulty alike to the patient and the operator to keep the cavity dry for cohesive gold—where gold amalgam fillings fail to prevent the reappearance of caries, and cement would be quickly washed away—here the use of tin and gold

cannot be too highly recommended. If the cavity is sufficiently deep, I lay the material (Fig. 11) first towards the far (distal) wall *a*, and press the tin and gold with a bent plugger against it. Beginning here, the cavity is gradually filled up towards the mesial wall, the latter is covered with tin and gold and condensed by pushing the instrument repeatedly backwards and forwards between points *a* and *b*.

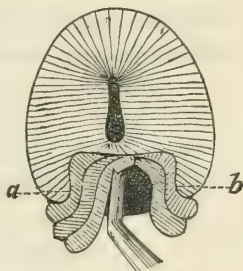


FIG. 11.

The principle of first filling the cavity to overflowing with tin and gold and then seeking to press the remaining overlapping pieces also into the cavity, is invariably employed in this as in other cases already described.

After the cavity has been well prepared, the filling material introduced and thoroughly condensed, the next thing to be considered is the finishing and final polishing of the filling. I remove all superfluous material from the masticating surface of molars with a large round finishing bur or a coarse-grained corundum stone. In both cases the stopping is polished towards the wall of the cavity and at the close of the operation the whole surface is burnished against the walls with an ordinary steel burnisher. In approximal cavities I first smooth the stopping with the wedged-shaped instrument No. 8 and remove the projecting material with a file, a saw or a thin lancet-shaped knife. As the condensed tin and gold is rather soft at the completion of the operation, the excess may be easily removed by these means, care being had always to cut towards the walls or margin. Then I polish the stopping with a strip or disc of sandpaper and my task is finished.

These are the methods I daily employ in filling teeth with tin and gold. It is, however, self-evident that my treatment—together with all other modes of filling—is subject to variation, particularly when working with non-cohesive material, and probably there are not two operators in existence who use precisely the same system, nor can every dentist fill in all cases after a given model.

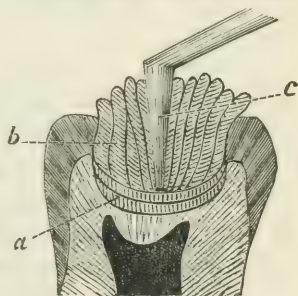


FIG. 12.

The use of wedged-shaped instruments (such as No. 7 Fig. 2) in the manner illustrated in Fig. 12

will suggest itself to every one who is familiar with the various methods of filling with non-cohesive gold. Particularly for central cavities instrument 7 may frequently be employed to advantage.

(To be continued).

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### THE APPLICATION OF HERBST'S METHOD TO TIN-GOLD FILLING.

By WM. M. GABRIEL, M.R.C.S., L.D.S.Eng.

WHEN experimenting with tin in conjunction with gold, I filled one or two compound mesial cavities in bicuspid and molar teeth out of the mouth. These cavities I partially plugged with the combination metal and contoured the crowns with gold. During my work I was struck with the much longer time needed for the insertion of the combined foils when filling with a matrix, some form of which is often indispensable when dealing with distal cavities in bicuspids and molars. The much greater care necessary to secure good edges I could not help also noticing.

The fact that it is possible by Herbst's method to weld and make tin quite solid, suggested to me that one might be able to work the combined foils in this way, and that the gold might be burnished so as to adhere to the combination metal.

I find the combined metals quite as easy to work by Herbst's method as tin or gold separately, and no more difficulty in making an *un-annealed* gold cylinder adhere to a foundation of tin-gold, by means of a burnisher rotated in the engine, than to a mass of gold. I think, however, that no more reliance should be placed upon this union than upon so-called retaining points; but that the coronal half of the cavity should be shaped so as to make the gold self-retaining.

Personally, I prefer to burnish gold over all the tin-gold exposed, and then complete the operation with the mallet; but this, of course, is quite a matter of taste.

The matrices I use are a modification of Dr. Guilford's bands, retained in position by his clamps A, B, C and sometimes D (*vide* p. xi in the Advertisement Sheet of this journal). These bands I hope to further improve and speak of at some future time.

It is difficult to keep the ends of the bands now sold from getting disengaged from the little points on the clamps. The fact that they rarely fit the tooth to be filled is another disad-



vantage. This can often be overcome, if the band be too large, by a wooden wedge driven between the band and the side of the crown of the tooth. I prefer, however, whenever possible, to cut out the cavity, take an impression, and wedge at the first visit, fit a band to the model and by means of this fill at the next.

I use a sheet of tin foil (S. S. W. No. 6), laid between two sheets of *cohesive* gold foil (Keasing No. 4). This is cut into two or three strips; made into ropes and cut into pellets. The gold cylinders used are S. S. W. Velvet (small sizes).

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### ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

THE First Meeting of the Society, for the session 1887-88, was held in the Rooms, 30, Chambers Street, Edinburgh, on November 10th.

Dr. WILLIAMSON, the new President, in taking the chair, said:—

GENTLEMEN,—In the first place, I have to thank you most heartily for the honour you have done me in electing me to the presidential chair. I regretted very much that I could not be present in March, owing to illness, but was somewhat consoled by the kind reference of the late President to my absence on that occasion. I do not intend to trouble you with an address on general matters, but will make a compromise by reading a paper on a special subject.

First, a word or two in regard to our meetings. Our limited number makes it rather difficult sometimes to secure a paper, and we are not in a position to receive so much extraneous aid as our more fortunate sister society in London; therefore I think we should pay a little more regard to our casual communications, which, in my opinion, have been too frequently rather badly treated, their discussion being apt to degenerate into a conversation between two or three members at the close of the meeting. In the Odontological Societies of London and New York they are always taken at the beginning, and it seems to be the natural course in leading up to the principal business of the evening. Also, to give them a more definite place in the programme, and also that one may have a better idea of what the business is to be, members would do well just to mention to the Secretary some time beforehand the nature of their communications. With our present system, it has always seemed to me to be a sort of waiting for something to turn up, a condition of mind which is disagreeable,

and not conducive to a proper consideration of what is brought forward in this hap-hazard way. This mild piece of reform will, I hope, obtain the approval of the members for our future meetings.

In conclusion, I have only to say that, having been always deeply interested in the welfare of the Society, I have no wish to see any signs of flagging vitality during the time I have the honour of occupying the chair, but I trust that members, by their attendance and contributions, either by papers, casuals, or by joining in discussions, will do more than sustain the character of the Odonto-Chirurgical as the representative Dental Society of Scotland.

The VICE-PRESIDENT (Mr. MacGregor) then took the chair, and Dr. Williamson read a paper, entitled

#### SOME REMARKS IN REGARD TO ARTIFICIAL CROWNS.

The subject of "Artificial Crowns" has been almost entirely neglected by our Society, and also in great measure by our sister society, the Odontological. The present time seems also particularly suitable for bringing it up for discussion, as we may, I hope, have the benefit of experience of those of our members who have had the good fortune to cross the Atlantic for the Washington Congress, and have had the opportunity of seeing the latest developments in the States.

The reader of the *Cosmos*, or other American journals, cannot have failed to have noticed during the last eight years the frequency of articles on the different methods of attaching artificial crowns to roots, latterly with the addition of a development in the direction of bridgework. Whatever may be the opinion in regard to this latter style of prosthetic dentistry, as to whether it will ever come into anything like general use, there can be no doubt that the retention of roots, in the first instance, which, of course, includes their proper treatment, and in the second instance, the attachment of a crown to these roots, will receive more and more attention from our profession. That so much work has been done in this way is in a great measure due to the failure of gold as a material for general use in the preservation of the teeth. I do not mean to say that gold is not still the best material for the filling of a tooth, but it has various insuperable objections in connection with its use, which necessarily limit its application. The larger and more complicated the cavity is, the greater are the chances of failure, so that with increased

risk the patient does not always reap a compensating advantage for the long period of discomfort that he undergoes in the chair. This fact, and also the evident incongruity of the appearance of large masses of gold in the mouth, has led to its almost total abandonment in cases where a large part of the contour of the tooth has to be restored, and has paved the way not only for contour amalgams in the back of the mouth, but also for the employment of various forms of crowns, both for front and back teeth. During the time I spent in the States, from 1874-76, the builders of gold were still in the ascendant, mainly due to the enthusiasm and ability of the late Dr. Webb, who possessed the highest possible ideal of gold contouring, and allowed no obstacle to come in the way of fulfilling the requirements of his ideal. If perfect adaptation to the walls of the cavity and restoration of form were obtained, he was satisfied, although the ordinary observer might object to the artificial and unnatural show of gold, the appearance of which, I observe, Mr. Tomes, in his third edition, characterises as "appallingly ugly" —a phrase in sorry contrast to the ideas of one who wrote of such work as being in common with that of Raphael, Canova, and Michael Angelo. If he put on a porcelain face, it was attached and the posterior contour restored with the electric mallet, an operation in itself of considerable difficulty, and taking several hours' continuous labour for its performance. Webb's thorough earnestness in the advocacy of such work gained him some followers, but the time and skill required, together with other objections, proved too much for the system, and it has rapidly lost ground, having given way before methods which give æsthetically better results than with gold, consume much less time, and seem, as far as present experience goes, to promise a reasonable degree of permanence. Thus artificial crowns may be classed with amalgam, as being the outcome of the immoderate use of gold, and might be included in the creed of the so-called "New Departure."

In this country artificial crowns, generally, however, known as pivots, have been used for a long period, but from what I have seen, I do not think that many practitioners have devoted much attention to them. There were, probably, two principal causes for this, the one being the fascinating ease, comparatively speaking, of making a plate, and the other the occasional after trouble from root membrane inflammation, the result of imperfect root treatment, or perhaps very often owing to the total absence of it. But, as I have



already said, with improved methods and increased knowledge, the tendency of the present time is to pay an increased respect to the mere roots of teeth, and, when reduced to that state, to restore to them their natural function of supporting a crown, an operation, I will call "crowning," and use that term in preference to "pivoting," because the latter word has been so much associated with one or two methods, and there is no real justification for its use from a dictionary point of view. Moreover, inaccuracies in dental nomenclature are apt to be commented on in these scientific days.

First of all, then, what are the cases suitable for this operation?

1. Where there is an almost complete set, and the crown of a tooth towards the front of the mouth is broken off as the result of an accident, or loss from caries.

To this rule, of course, there are obvious exceptions, as in the case of young persons where the teeth are crowded, and the extraction of a root would be more beneficial, or where there is not crowding, and the root is behind the canines, as, for example, a first or second bicuspid.

2. Where there are several crowns broken off, especially towards the front, and the other teeth are in a satisfactory condition.

It must also be premised that the roots themselves are, or can be rendered, capable of supporting a crown.

These two rules, I think, exhaust the ordinary conditions where crowning is advisable; for when you get beyond the stage described in the second rule you come to the borderland between crowns and plate or bridge work. One must judge for themselves whether, if the available roots are crowned, there would be sufficient masticating power. If, for example, when completed, the patient could use effectively one side of the mouth, the front arch unbroken, and extending to the second bicuspid on the other side, there would be no occasion, in my opinion, to insert a plate in order to supply the deficiency of these molars on the side where they were absent altogether. Besides, it must also be remembered that the additional two molars on a plate do not necessarily correspond as regards function to two natural molars, their usefulness being not infrequently of a very inferior kind, too often presenting mere flattened surfaces, only available for rubbing food against, not for masticating in the proper sense. In regard to this matter, we are not always, perhaps, so much to blame, as we frequently find that the tooth has to be cut down for the bite, and a cuspid surface

cannot be again produced without danger of weakening the crown at its most important part. The manufacturer, however, is beginning to do his part by giving us more anatomically correct bicuspid and molars, which may be used with advantage where the bite will allow.

To return to the point, however, I may say that in several cases I have regretted putting in a plate where crowning might have done. In young persons especially, who are often careless in regard to cleanliness of the mouth, a plate is often very detrimental to the other teeth; for example, I have a case in my mind, where I put on a central and lateral crown for a youth about eighteen years of age. This was done some four years ago with oxyphosphate, and a year or so afterwards the lateral was broken by a blow. I was from home at the time and my *locum tenens*, not caring to undertake the drilling out of the broken pin, put in a plate, which also carried a tooth filling up a vacant bicuspid space. In a very short time afterwards I saw him, and found that not being careful about removing the plate, there was quite a broad softened band of decay on the distal surface of the canine where the clasp touched, and which had to be prepared and filled, the plate being removed, and another crown attached to the lateral root. In this case the filling up of a partially closed bicuspid space, involving a plate, would not compensate the patient for the injury inflicted on the other teeth, because the slight additional advantage, either from the æsthetic or the practical point of view, of the necessarily unnaturally small tooth, could hardly be regarded as sufficient reason for its presence. Again, however, where you find in a young person a general decay of all the teeth, lower incisors for example being involved, and where fillings have repeatedly failed, in such a case operations for crowning the teeth are very liable to failure also, and a suction plate is probably the best treatment.

Having decided, then, to crown a root, the question will arise in some cases as to whether any portion of the natural crown rising above the level of the gum should remain. Some expert operators have retained half of a central incisor, and fitted a piece of porcelain tooth to restore the contour, an operation requiring great care and accuracy of adjustment, not to speak of the difficulty of matching the shade, and not so easy a matter as matching a whole tooth, also with the superadded difference of colour

produced by the filling behind it, and which, in fact, in many case quite alters the original colour of the porcelain fragment. In many cases, also, the operation cannot be reckoned likely to be very permanent, the strength of the attachment not being very great. It is, therefore, I think, better to remove such portions to a point below the level of the gum outside, while on the inside the root may with advantage be left above the level of the gum, as the joint is visible, and being kept clean by friction of the tongue, decay is not so liable to recur at that point.

#### PREPARATION OF CANAL OF ROOTS.

This is one of the most important steps in the operation, and resolves itself into the best method of filling roots, a subject in itself, and I will only make a remark or two on it, giving the general method of procedure adopted. When the pulp has been removed, the canal is thoroughly dried out with the solution of iodol in absolute alcohol, then one of the S. S. White gutta-percha points is selected, judging the size either from the extracted pulp, or to make more sure, it may be placed in the root, and if suitable, is ready for permanent insertion. The canal is swabbed freely with chloroform, or better, perhaps, eucalyptus oil, which is not so rapid a solvent of gutta-percha, and is also strongly antiseptic, and dissolves iodol, the crystals of which will have been deposited on the canal walls. This being done, the point is rapidly pressed up into place in the roots. If chloroform is used, it is better to put the point up as far as it will go, and then put a pledget of cotton, soaked with chloroform, in the cavity, so that it may run up by capillary attraction, and then press the point a little further up the root. Where the pulp has been destroyed for some time, and the contents offensive, the canal, after being cleansed as far as possible by instruments, is disinfected by a liberal pumping of the peroxide of hydrogen solution, and then the same procedure as in the first instance. This method is, I think, by far the simplest and best way of filling accessible roots, with whatever end in view. Oxychloride of zinc on cotton I have always found troublesome to manage, it being difficult to get the little pellet of wool saturated with osteo up to the apex, the probe being apt to go through it, and the pellet, in the endeavour to force it up, becomes changed into a short rope from sticking to the sides of the canal. With the gutta-percha point there is no trouble of this kind, and the



whole cavity is filled at once, the piston-like action of its insertion being more objectionable in theory than in practice. Where the root is intended for a crown, it is of course necessary to fill the apex only, but with the method spoken of there has been no extra trouble in filling the whole length of the root, and the adhesion of the gutta-percha to the walls of the canal prevents its being torn away from the apex by the action of the drill in preparing the root for the insertion of the dowel pin.

*(To be concluded.)*

### DENTAL HOSPITAL OF LONDON.

THE Annual Dinner of the Past and Present Students of the Dental Hospital of London took place on the 3rd ult. at the Holborn Restaurant, Mr. GEORGE GREGSON, M.R.C.S., L.D.S.Eng., in the chair.

The usual loyal toasts having been duly honoured,

The CHAIRMAN proposed "The Past and Present Students." He said that the toast had always been considered the toast of the evening in connection with the dinner, and he rejoiced to recognise in the presence, in such goodly numbers, of past students from distant parts of the country, which made their attendance a difficulty and a self-sacrifice as well as a pleasure, an evidence of that warm feeling of affection and attachment towards their *alma mater* which was at once one of the best proofs of the good work it had done in the past and the good they had received from it, and a demonstration that as a profession they were not wanting in one of the best feelings common to humanity—viz., that of gratitude.

In speaking of past students, the honoured names of those who had composed the original staff of the School and who had so nobly contributed to raising the profession to its present acknowledged status would at once occur to them, of such men as Sir John Tomes, Mr. Samuel Cartwright, Mr. Geo. Augustus Ibbetson, Mr. Robert Hepburn, Mr. C. S. Tomes, and Mr. Thomas A. Rogers. All of them without exception had the interest of the students at heart, and they could never forget how much they were indebted to them. Neither could they forget their indebtedness to their great parent society, the Odontological Society, which was the originator of the great and increasing progress their profession had made of late years. In connection with the present students, he

referred them to the Students' Society, which was doing excellent work and which had the hearty good wishes of the whole profession. He also dwelt upon the close association existing between the dental and medical professions, a connection which he regarded as a subject of congratulation to both past and present students. The toast opened up an almost endless theme upon which to address them, but he would not weary them with much speaking. He concluded by giving them "The Health of the Past and Present Students," coupled with the names of Mr. E. Bartlett and Mr. G. Seymour.

Mr. BARTLETT and Mr. SEYMOUR briefly responded.

Sir EDWIN SAUNDERS, in proposing "The Hospital and its Staff," said : Mr. Chairman and Gentlemen,—The toast which it is my privilege to propose to you is one for which it is safe to predict a cordial and enthusiastic acceptance : it is "The Dental Hospital and its Staff." In this large gathering of past and present students, whose presence at this festival may be regarded as a proof how deep is the interest they feel in all that concerns its welfare, I think we may discern good grounds for its acceptance ; for, as our Chairman has observed, many who are here present have come from a great distance and at some not inconsiderable personal sacrifice, and I think, sir, it is a matter for congratulation that—thanks to the unanimity and good understanding which have always prevailed, and which it is to be hoped always will continue to prevail, among the various sections of the profession—the time for this festival should be made to coincide with the meetings of the Odontological Society and the Representative Board of the British Dental Association. If, then, I am asked the reason why I anticipate a good reception of this toast, I would answer, we all acknowledge the force of the truism that there is no attachment so strong and lasting as that which we feel towards the institution or the person from whom we receive useful knowledge, that knowledge which is to the earnest student as a new birth, a birth of the intellect ; that knowledge which is to fit us for our chosen career in life ; that knowledge by which we are able to render useful service to our fellow-men, and from which we hope to receive our legitimate guerdon—an honourable competence and a corresponding social estimation. May these not unreasonable expectations be realised in the life experience of the past and present students of the Dental Hospital of London. It might seem to be a work of supererogation in reference to our Hospital to point out its unique

advantages of site and structure, but that we are prone to undervalue that with which we have been long familiar. It is not very long since—and it is still somewhat possible that we might be sacrificed to a contemplated street improvement—that a well-informed member of the profession said to me that he supposed in that event that we were not particularly wedded to Leicester Square ; but when I reminded him of our extended frontage, our wide open space, our uniform light in summer and winter, due to our northern aspect, our easy access from all parts of London, and our comparative quiet, he readily admitted that such a combination of advantages it would be difficult to find elsewhere. While we were quite ready to appreciate all these advantages, we were not blind to the fact that there were certain structural defects—notably, the want of a good lecture room for the students and a larger waiting room for the patients. And when, from the augmented state of the former and the already crowded state of the latter, the efficiency of the School became imperilled and the subject would not admit of a longer delay, then, gentlemen—thanks to the energetic action of your Dean and Mr. Hutchinson, and one or two other determined spirits, members of the staff, backed by the munificent donations in money, one of £1,000 from the Medical Committee, and numerous other smaller amounts, the result of the persistent efforts of our indefatigable Secretary—these extensions were not only undertaken, but space is being provided by a corresponding enlargement of the stopping room for some ten or twelve additional chairs.

I have occupied so much time in speaking of the Hospital that I have lost sight of the fact that the toast is a double one, and I have left no space to refer to the staff, but it is needless to refer to them. Are they not known in this company and recognised as worthy successors of the honourable band to whom our Chairman has referred, the pioneers in the work—Tomes, Cartwright, Rogers, Ibbetson, Underwood, Hepburn, and Smith-Turner—names that will ever be held in affectionate remembrance? The toast is “The Hospital and Staff,” coupled with the name of Mr. R. H. Woodhouse.

Mr. WOODHOUSE responded in a speech which, judging from the hearty reception accorded to it by those who sat near him, was a very able one, but unfortunately it was inaudible at the reporters’ table.

Mr. J. SMITH-TURNER, who was received with loud and



continued cheering, proposed "The London School of Dental Surgery," and said our School was established for the purpose of giving gentlemen an opportunity of obtaining the teaching necessary to qualify, in conjunction with the opportunities afforded by Middlesex Hospital—that was the first general hospital in London which made provision for the dental student. In conjunction, I say, with the teaching at the general hospital, our Dental School was established to afford dental students an opportunity of complying with the curriculum demanded by the Royal College of Surgeons, in connection with the diploma which it had so generously instituted. And when, gentlemen, the body of men whose names have been so cordially received—and many of whom are with us to-night, I am happy to say—when these gentlemen perceived that this voluntary examination should become compulsory, they were enabled in going before the proper authorities to say there were two Dental Schools in London with a large number of students, who were voluntarily prepared for this voluntary examination, and they were enabled to urge and with an irresistible force to foreshadow the change that would come over dentistry, and also to point out the advantages which would accrue to the general public by such an arrangement. Well, you know, in promoting and passing the Dentists' Act these gentlemen succeeded in making dental education compulsory, and on the passing of the Act became recognised the value and importance of the dental surgeon. By this recognition there was involved in the change which then took place many things and many conditions which are now being slowly but surely recognised; so slowly indeed are they being recognised that they almost creep up beside us and take their place unawares, as if no great change had ever taken place. It is satisfactory to think our Dental School was so prominent a factor in bringing about these great changes, for it has been a change of the most marked kind. To those who have from time to time, from year to year, attended gatherings such as this, not only in London, but throughout the country, one great fact must have forced itself upon them, and that is that the *personnel* of our profession has been entirely revolutionised. I think that at least the good old days of tooth drawing and of the tooth drawer are gone for ever. I think, gentlemen, that not only has the instrument to which Mr. Bartlett referred—the key—become unpolished, but so also have the operators, and the

day of the mechanic in his Sunday clothes posing as a professional man has passed away.

Well, gentlemen, that is a very gratifying view to be able to take of the progress we have made, and I do not think it is too flattering a view to take. The London School of Dental Surgery has made progress and its latest developement is one which I am sure will be hailed with the greatest satisfaction. It is the establishment of an Athletic Society, the president of which is Sir Edwin Saunders. That Society has also made great progress, for I find it has brought forth triplets from its radiate three sections, the Lawn Tennis Club, the Cricket Club, and the Football Club. I do not know much of the Lawn Tennis Club or the Football Club, but I hope the members are more successful in bowling down "stumps" than in kicking goals. When I look at the physique of our students, I look to the time when they will show their appreciation of the football and cricket field by the energy with which they will support the welfare and best interests of our profession. Well, gentlemen, our School has been very fortunate in having to deal with such a body as the Managing Committee of the Dental Hospital, the Chairman being one of the most urbane and reliable chairmen one could possibly have. Certain members of that Committee seemed ready at any time to give ungrudgingly, not only their professional advice and their professional skill for the benefit of the Hospital upon which we depend for so much, but they seem to take as great an interest in the progress of our School as if their whole future depended on our well being. The Medical Committee have recognised that the vast mass of the work of the Hospital is done by the students and by gratuitous labour, such as that of the anæsthetists, and in recognising these facts they have spared no pains to meet the requirments of the School, to study the comforts of the operators and the students and to approach the question of increased accommodation brought before them in a true spirit of judicious liberality. I think the School has been very fortunate in having such a Committee to deal with for everyone must know the vital importance of harmony between the Staff and the Committee. Well, with this great hospital, of which you have heard so much to-night, there is a grave responsibility resting upon the Staff, but more particularly upon the Lecturers; for although the education has become compulsory, it is very far from perfect. This question is forcing itself

upon us in many ways and by various evidences, and it will be the duty of the Staff of the Hospital to meet the problem. They must meet it carefully and cautiously, and they must remember that the best results are derived from corrected errors. I think it is a problem worthy of the best intellects we can command. I trust the success of our lecturers and of our students may continue to be in the future as they have been hitherto, progressive; but

“The best laid schemes of mice and men may fail.”

I would, therefore, ask you to drink to-night to the health and success of the London School of Dental Surgery, and when I tell you the name I am going to connect with the toast I do not think even the long speech to which you have listened will damp your ardour or the heartiness of the reception you will give him. I refer to Mr. Morton Smaale.

Mr. MORTON SMALE, who was cordially received, said: That some of the aspirations so kindly sent up year after year in connection with this toast seemed to be taking effect, as they had heard the London Dental School was enlarging its borders. They had no fewer than 27 new students entering this year. There seemed to him to be a little omission in regard to the toast. He thought they should include the past and present lecturers, for they were those lecturers whose names had been received with so much deserved applause that evening, to think of whom called up all kinds of tender memories. They seemed to be almost giants compared with the men of the present day. These gentlemen who had done so much for them commanded their highest admiration and veneration. It was to them that the thanks were due for the present perfection of their School. They had shown a noble example of self-sacrifice, and it seemed to him that the present staff had caught the enthusiasm and were zealously carrying on the good work. It was not a common thing for the staff of a hospital to contribute a £1,000 towards improvements, and such a fact was the strongest and best proof that the spirit of earnestness and zeal which animated their predecessors had fallen upon the men of to-day. He remembered some one talking to John Bright and trying to enlist his sympathies for some poor women. John Bright replied “This is all very nice. I sympathise £5. How much do you sympathise?” Well the staff has sympathised to the tune of a £1,000. How much did they sympathise? They looked to those gentlemen who had just left



the school to maintain the enthusiasm and carry it on for the future, so that they might always have a thoroughly successful School.

Much had been said about the Royal College of Surgeons, the Odontological Society and the British Dental Association. All these have done much good for them, but he thought the London School of Dental Surgery had done them the most good. Nothing had so raised their profession as the London School of Dental Surgery. It was there that they learnt from those whose names had been mentioned to be thorough workers in their profession, and from those gentlemen they learnt also that it was their duty to endeavour to become cultured gentlemen. Much had been said by Mr. Turner about the Athletic Club. All good schools should have a good athletic club. It was the safety valve for those high spirits which, happily, most of their students possessed, and which, kept in their proper channels, were the best augury for their future success. He knew of nothing so really good and useful as a good athletic club. If they had that they might be quite certain they would have men who would come out worthy of their profession. With reference to their club, he must say they would owe a very great debt of gratitude to one of the House Surgeons, Mr. Colyer, who, as an illustration of a good player being also a good worker, he might remind them, took the Operating Prize the year he competed for it. In conclusion, he had very great pleasure in thanking them, on behalf of the London School of Dental Surgery, for the way in which they had received the toast.

Mr. S. J. HUTCHINSON proposed "The Visitors," coupling with the toast the names of Dr. Julius Pollock, the Senior Physician of Charing Cross Hospital, and Mr. Pierce Gould, Dean of Middlesex Hospital, and in the course of his remarks referred to the consideration which these two Hospitals had shown in so fixing the time of their lectures that the dental students could attend them.

Dr. POLLOCK, who was received with cheers, expressed the honour which he felt at being called upon to respond partially for the toast, and regretted the absence of Dr. Mitchell Bruce, the Dean of the Charing Cross Medical School, who, he knew, exceedingly regretted his inability to attend. He referred with gratification to the extension of the London Dental School, which augured so well for the estimation in which it was held, and

showed the increased amount of good work it was prepared to undertake. They at Charing Cross contemplated an extension in their School, a piece of extravagance for which he was afraid the London Dental Hospital was somewhat responsible. He gracefully attributed the large attendance of dental students at the Charing Cross Hospital rather to the convenience which the close proximity of the two Schools afforded than to any special merit in the lectures. He concluded by saying that the Charing Cross Hospital looked to the Dental Hospital as one of their great allies, and he hoped the two institutions would always go hand in hand as long as they existed.

Mr. PIERCE GOULD, whose rising was greeted with loud cheers, said: I, too, would join with Dr. Pollock in thanking you for the kind way in which the toast has been proposed and the hearty way in which it has been received. It is difficult for me to consider myself a visitor, for, from one circumstance and another, I have a very large number of personal friends and acquaintances in this room. As I look down this table and recognise in almost every face some one I know, I feel very much at home. It has been my fortune to be connected with three hospitals at different times, and now for a number of years I have been on the staff of the Middlesex Hospital, which is very closely associated with the Dental Hospital in Leicester Square. That association, sir, has been very kindly spoken of both by you and by others on behalf of the Dental Hospital, and if words would come to me I should be glad to speak in far stronger terms than I use now, for the very kindly feeling which is extended towards us, and which I may say we reciprocate. Sir, we are always proud to think that on our consulting staff we have two members of your consulting staff, Sir John Tomes and Mr. Smith-Turner; nor, sir, are we less proud to think that upon our acting staff we have two of your acting staff, Mr. Storer Bennett and Mr. Hern, and, sir, I think I am not in error in saying we may claim some association with you who occupy the chair to-night. These considerations make it a very pleasant duty to dine with you and respond to this toast. I do not know that I need add more, but I should just like to say this, my friend Mr. Hutchinson has referred to the advantage of the dental student being compelled to obtain part of their education at the medical schools, and I can reciprocate the sentiment and say it is no little to us to have dental students working with us; personally I may speak in the very highest terms of the dental students who come to our hospital.

From the very necessities of the case of their having to carry on two kinds of education concurrently, their industry is very much marked. It has often caused me admiration to see them pass the examination of our school, and yet at the same time pass their own examinations. Not only are they able to do this, but they have carried off prizes over the heads of gentlemen who have had nothing but their own medical work to attend to. And, sir, the education being divided between the two schools, serves to remind us of the vital connection there is between dentistry and surgery in general. We must all of us have met cases of this kind, but in connection with the students we are unable to forget it; and this leads me to congratulate you, if I may venture to do so, upon the high position that the dental profession is now taking. I am sure I am giving utterance to a sentiment with which all surgeons will agree when I say you are taking up a position which you did not occupy a few years ago. We all recognise the importance of dental surgery, and personally I regret I do not pay more attention to it. I trust, sir, that the union between the general medical and the dental profession may become more intimate. In our scheme of clinical appointments we have made it a rule that all our students shall serve as dressers to Mr. Bennett and Mr. Hern; we not only appoint them as dressers, but it is impossible for the best prizes to be taken by those who have not so served. In conclusion, I beg again to thank you for the hearty reception you have accorded to the toast and for having connected my name with it.

Mr. THOMAS UNDERWOOD proposed the health of the Chairman and said, to speak of one whose excellencies were so well known was like repeating an oft-told tale, and he was certain he should carry with him the feelings of past and present students in expressing his appreciation of the services of their Chairman, whose name among the pioneers of dental reform was not the least worthy among the honourable band who had been mentioned that evening, and whose career not only as a professional man but as an English gentleman was beyond the reach of criticism.

The toast was very heartily received and was drunk with musical honours.

Mr. GREGSON appropriately acknowledged the toast.

The dinner was enlivened throughout the evening by an excellent selection of music, both glees and solos, chiefly amateur, contributed to by the staff and past and present students, under the direction of Mr. David Hepburn.

### PASS LIST.

#### ROYAL COLLEGE OF SURGEONS, ENGLAND.

THE following candidates having passed the necessary examinations, were admitted Licentiates in Dental Surgery on the 2nd of November: Ackland, Robert; Badcock, John Henry; Colyer,



James Frank; Goard, Thomas Arthur; Jones, Albert Sydney; Kendall, William Henry; Miller, Frederick Tayler; Morley, Charles Reginald; Picton, Henry; Saul, Barnett Bendet; Smith, Arthur Hopewell; Stoner, Harry John; Wakefield, Stanley Bennett.

#### ROYAL COLLEGE OF SURGEONS, EDINBURGH.

During the October sittings of the Examiners, the following gentlemen, having passed the final examination, were admitted Licentiates in Dental Surgery of the College:—Ernest Edmund Taylor, Manchester; John Girdwood, Edinburgh; John Bain, Galashiels.

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#### OBITUARY.

WE regret to announce the death of Mr. George Beavis, which occurred on the 6th of November, in Ann Arbor, Michigan, U.S.A. He succumbed to a severe attack of pleurisy after an illness of ten days' duration. Mr. Beavis had been in America fifteen months, and had gone to Ann Arbor to do the curriculum of Michigan University for the D.D.S. He was L.D.S.I. (*sine curriculo*), and was an enthusiast in all things connected with the profession, being a regular attendant at the annual meetings of the British Dental Association. He will be missed by a large circle of professional friends. He was a comparatively young man, being only 39 years of age at the time of his death.

WE also regret to record the death of William John Newman, Mount Pleasant, Liverpool, which occurred in the middle of November. He was L.D.S.I., Member of the Odontological Society and B.D.A.; the founder and a member of the staff of the Liverpool Dental Hospital.

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#### CORRESPONDENCE.

##### COMBINED GOLD AND TIN FILLINGS.

*To the Editor of THE DENTAL RECORD.*

SIR,—On p. 529 of your issue for December, I note another attempt to give Dr. Abbott, of Berlin, the credit of having first used a combination of gold and tin foil. Dr. Abbott might possibly have seen these fillings done in England, and have been the first American Dentist brave enough to defy the opinions of the American Dental Societies of his time by using such a mixture. Twenty-six years ago, when I com-

menced practice, I adopted the method of using gold and tin foil rolled together, not from any original experiments or views of my own, but simply from the fact that I constantly saw very old and perfect fillings done by the same method. Some of these fillings must have been something like twenty years old when I saw them twenty-six or more years ago, and I have no doubt that Mr. James Lomax, of Manchester, had inserted thousands of mixed gold and tin fillings before the date Dr. Abbot was supposed to have originated the practice.

The thorough work done by Mr. Lomax, and his system for using the combined metals, were very well-known to all the best operators of his time in the district, any of whom will be able to bear me out in the statement that the system supposed to be originated by Dr. Abbot twenty-five years ago was old, well-known, and largely practised at the time.

THOS. FLETCHER.

Warrington.

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### ANSWERS TO CORRESPONDENTS.

SLINGSBY, L.D.S.—The A1 composition was referred to in the review of "Hunter's Mechanical Dentistry."

MOLAR.—No information of the kind has been received by us, or it would have been acted upon

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### GOSSIP.

THE Dental Hospital of London, Leicester Square, has received £1,000 from its Medical Staff and Lecturers towards the £5,000 required for the extension of the Hospital now being carried out.

THE total length of the submarine telegraphs at present in existence is 107,000 miles. These are all the result of private enterprise, and, with the exception of about 7,000 miles, are under British control. They represent a cost of 37 millions sterling. The total length of land lines now in operation is 1,750,000 miles.

THE fishes of the Sea of Galilee, have been proved to belong to species peculiar to African lakes, and not to Mediterranean kinds.

THE progress of modern cotton spinning, is best shown in the fact that 15½ miles of yarn are spun for two-pence, exclusive of the cost of the raw material.

THE bacteriology of malaria has for many years occupied the attention of pathologists. In 1879 Crudeli, in conjunction with Prof. Klebs, published observations which tended to show that in malarious districts a bacillus inhabits the soil.

THIS bacillus has been cultivated by Dr. Schiavuzzi, of Pola, who has inoculated animals with the product and induced in them a fever of an intermittent type. He has also obtained photographs of the bacillus. Although his evidence is not conclusive, yet there is good reason to think that he has approached nearer to a solution of the question than any of his predecessors.

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SACCHARINE has at last become an article of commerce. This substance is so intensely sweet that if it be tasted in its pure state the delicacy of its flavour is obscured, as it produces so acute an action on the nerves of taste that it deadens their sensibility. It is when it is properly diluted, that its sweetening power is fully brought out. According to Prof. Stutzer, of Bonn, its presence by taste can be detected when one part by weight is dissolved in 70,000 parts by weight of pure distilled water. It has marked antiseptic powers. In this direction it is almost as energetic in its action as salicylic acid and thymol. It is also absolutely non-fermenting.

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ACCORDING to Herren Spillmann and Häuhalter, the common house fly haunts the beds of consumptive patients in hospitals and sucks up the sputum. Some of these flies were caught and placed under a bell-glass. Their excrement was found to contain numbers of the bacillus of Koch.

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AN electric pen may be easily constructed from a common pencil, the current being conveyed through the so-called lead or graphite core.

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THE coldest known point of the earth is stated by Dr. Köpperen to be Nerchojansk, in Siberia, lat. 67.34, long. 133.51. There the mean temperature for the year is nearly 3 degrees below zero of Fahr. The mean for Jan. and Dec. is 62.9 below zero, while the minimum of Jan. is 88.6 below zero. In July the temperature rises to 60.6 and the minimum for the same month is 39.2.

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ACCORDING to Professor Gamgee, the total income and expenditure of energy in the human body corresponds to the amount of heat required to raise 595 lbs. of water from the temperature of melting ice to the boiling point. He conceives that the heat is produced first in the muscles and secondly in the glands.



THE new mint of the Chinese nation is to be supplied with ninety noiseless presses, capable of producing 2,700,000 silver and brass coins per day. Each machine will turn out from 60 to 80 coins per minute, with a pressure of 40 tons at each stroke.

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THE latest triumph in synthetical chemistry is the production of glucose or grape sugar from acroline by Dr. Emil Fischer and Julius Tafel. The base—acroline—which is obtained from fatty matter by heat—is familiar to most persons in the unpleasant odour of the half-extinguished candle, and also in the burnt fat, the result of the intrudant hot cinder. In producing the glucose, the acroline is first converted into its dibromide ( $\text{CH Br. CH}_2\text{Br. CHO}$ ) which is then treated with cold baryta water, by which the bromine is removed, leaving the sugar in solution. The real difficulty lay in isolating the sugar. This was eventually overcome by the use of phenyl hydrazine and the action of nitrous acid. The result is a syrupy substance, possessing all the properties of sugar, but distinguished from ordinary grape sugar, and also from cane sugar, by its optical inactivity. The natural varieties of grape sugar, glucose or dextrine, rotate the beam of polarized light to the right, as the last name implies, while cane sugar, which is termed *lævo*, rotates it to the left. In the synthetically formed sugar there is as much a tendency for one kind as the other to be formed, and probably both are formed at the same time; hence they neutralize each other.

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THE locomotives of the world number 105000, representing three millions of horse power. Adding to this the other powers, as working steam engines of various kinds, we obtain a total of 46 millions of horse-power. A horse power in steam equals three actual horse-power and each horse equals seven men. The steam engines of the world therefore represent approximately the work of 1,000,000,000 men, or more than double the working population of the world.

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THE means of communication by telephone with a train while in rapid motion, is occupying the attention of some of the most advanced electricians, and the results already obtained look promising. The *modus operandi* is based upon Professor Henry's demonstration of the inductive action of one electric coil on other coils situated in different parts of a house.

PROFESSOR SCHAFER'S conception of the cell is ;—its essential part is not the reticular substance, but the interstitial substance. He points out that the various materials are produced in the cell by the activity of its protoplasm, as it appears in the interstitial substance, and he further says that the *Amœba* present no reticular substance whatever. The white corpuscles have a reticulum like other cells, but the pseudopodia are prolongations of the interstitial matter ; hence the activity of the cell for movement is lodged in this substance and not in the reticulum. Dr. Dallenger has shown, that division first takes place in the interstitial matter, before division of the reticulum occurs.

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MR. HEDDERWICK, in his lately published work on the stage, says :—The Germans do not appear to have had a notion of play-acting until the strolling troops of English comedians landed on their shores.

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THE HON. ROGER NORTH, writing to the Hon. Mrs. Foley, from London, May 8th, 1700, says :—You will hardly tell by what you see that I write with a steel pen. It is a device come out of France, of which the original was very good and wrote very well, but this is an ill-made copy. When they get the knack of making them exactly, I do not doubt but the government of the goose quill is near an end.

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ONE of the most illustrious men of science of the present century, Gustav Kirchhoff, has lately gone over to the great majority. His name and fame will ever be associated with spectroscopy, in which, with Bunsen as a collaborateur, he laid the foundation of a science which has given to the physicist a new method of investigation, which has yielded some of the most brilliant results that have ever adorned the annals of science. On the same day also died Robert Hunt, F.R.S. ; he was the first who wrote on photography as a science, and with him originated the term Actinism, as expressing that chemically acting quality in the solar spectrum upon which the photographic Art depends for its beautiful results. He investigated the effects of coloured media on the germination of seeds and the growth of plants. He was also the author of "Panthea, or the Spirit of Nature," and of numerous scientific memoirs. He died on the 16th of October.

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# THE DENTAL RECORD.

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## ON THE COMBINATION OF TIN AND GOLD AS A FILLING MATERIAL FOR THE TEETH.

By W. D. MILLER, M.D., Ph.D., &c.,

Professor in the Dental Institute of the University of Berlin.

*(Being a series of Lectures delivered in the Institute, and translated from the  
German by Miss St. George Elliott.)*

*(Continued from page 28.)*

### THE PROPERTIES OF THE MATERIAL.

HAVING described to you the effects of stopping teeth with tin and gold, I proceed to speak of the properties of this material.

The ideal properties of a filling material are generally stated to be—1, hardness; 2, indestructibility; 3, adaptability; 4, suitable colour; 5, non-conductivity; 6, ease of introduction. It should furthermore, 7, not injure health; and, 8, be but slightly injured during the operation of filling by the entrance of moisture.

I doubt if there is any material which can be said to possess so many of these desirable qualities in so great a degree as does the combination of tin and gold.

The hardness (1) of such a filling is, at the beginning, not much greater than that of a tin stopping; but in the course of a few weeks a remarkable change takes place by means of chemico-physical influences, and it becomes so hard that it will last for years without any or but little perceptible wear.

(2) The fluids of the mouth have no effect upon the material—*i.e.*, do not dissolve it. After the change to which we have just referred takes place, the stopping remains invariable.

As regards permanent adaptability (3), no filling material, with the exception of the several cements and prepared gutta-percha, can be compared with the combination of tin and gold. This material



is extraordinarily soft, and is with great ease adapted to the wall of the tooth ; further, as a result of the remarkable change just mentioned, a slight expansion of the material takes place, which hermetically seals the cavity, even when the operation seemed somewhat defective. But, of course, such a result is only expected when the material is well condensed. It would be a fatal mistake to take it for granted that this material will act like a sponge when the filling is superficially condensed and inadequately prepared, and to suppose that it will swell and by this process become a good stopping. I will here only impress the fact upon you that a well-made and finished filling of tin and gold will, in consequence of the slight expansion which ensues, become so well adapted to the walls of the cavity, and also remains in such good contact with it, as would not be expected of gold.

In this respect, also, tin and gold presents a strong contrast to most of the amalgams. The so-called platinum, gold or silver amalgams contract after a certain length of time, although at first they may adapt themselves to the form of the cavity. It is for this reason that I affirm that, in respect to *permanent* adaptability, amalgams are far exceeded by tin and gold. Those who will take the trouble to examine a large number of old tin and gold and an equal number of amalgam stoppings, may easily convince themselves of the truth of my statement. There is, as far as I know, but one exception to the general rule—that is, copper amalgam.

Concerning colour (4), the odds are against tin and gold. The filling is at the beginning grey, and in many mouths retain this colour ; in others, however, it becomes dark or even black, and is therefore not suitable for stopping in front teeth. On the other hand, in contrast to amalgam, this material never discolours the tooth substance, not even when it is employed to stop a cavity filled with saliva. It can, therefore, be used in unseen cavities in front teeth ; if, however, the labial wall of such teeth is very thin, the tin and gold may show through the transparent enamel. To guard against this, several gold pellets are first placed against the thin wall before inserting the tin and gold.

For all cavities on the distal surfaces of cuspids, as well as those on the lingual surface of incisors, there seems, as a rule, to be no contra-indication respecting colour.

This combination is (5) a bad conductor and can therefore be brought nearer to the pulp than gold, and it can have (7) no injurious

effect whatever upon the general health of the patient, or upon the mouth.

In regard to the rapidity and facility (6) of the introduction of this material into a cavity, it is in many cases about all that can be desired. A large filling on the masticating surface which can be built of gold in fifteen minutes may easily be made of tin and gold in five or six minutes; in complicated approximal fillings the difference in time is much greater. In central cavities, upon the masticating surface of molars, the work can be done much more quickly than with any other material, and I have occasionally inserted a tin and gold stopping in less time than is usually taken for mixing the amalgam or cement to be used, especially the latter when the acid is in crystal form.

This material is (8) not perceptibly injured by moisture, not even by the access of liquids during the operation. In effect it seems as if the chemical and electrical changes of the material, upon which its superior qualities to a certain extent rest, take place more rapidly when the filling is somewhat damp, as I have already explained in speaking of this matter at the Convention of Naturalists and Physicians in Berlin in 1886. Fillings which have been made under saliva are, after a lapse of several months, seldom to be distinguished from those which have been put in dry. But I do not wish to have it understood that the stopping must be put in wet, simply that it may be done when it is difficult to keep the cavity dry, or when it is deemed advisable by wetting the first pellets of tin and gold with the solution mentioned in the concluding chapter, to have an antiseptic after-effect, or to harden the material more quickly than is usually possible. The enormous advantage possessed by this one quality of the combination of tin and gold must strike even the most casual observer.

Let us now proceed, gentlemen, to answer the question :

#### WHEN IS THE MATERIAL MADE USE OF ?

As I have already stated, the operator should choose for each cavity the material best suited to it. You know the qualities of tin and gold, and I will now enumerate the cases for which it appears to me eminently suitable. For my practice I am especially fond of employing tin and gold in teeth having an enamel of a soft chalky nature, which shows but little resistance to decay, and where a water-tight stopping is necessary. This is not attainable with gold,

and naturally much less with amalgam, so that often, after a short time, secondary caries appear around the margin of the filling. After observation of many years' duration, I have come to the conclusion that tin and gold is well adapted to overcome this difficulty.

I also use this material in all cases where it is impossible to obtain complete dryness in the tooth; in extensive caries on the approximal and buccal surfaces; where the decay extends deep under the gum; in teeth which have not completely erupted, so that the adjustment of the coffer-dam is exceedingly painful;—in short, wherever it is difficult to exclude the fluids of the mouth. For these reasons I treat the first permanent molars with tin and gold, as they are apt to become carious soon after erupting, if they are soft or the patient is restless or troubled with saliva. In later years this tin and gold may, if it is thought advisable, be capped with gold.

Tin and gold is also recommended as a filling material for teeth with extremely sensitive dentine, because no especial retaining-points or deep undercuts are necessary. It is also equally adapted for teeth which are sensitive to changes of temperature, as it is a poorer conductor than gold. Where, on this account, the latter is contra-indicated, one can usually directly fill the cavities with tin and gold.

It is also frequently of great assistance where caries has penetrated nearly to the pulp and where it would be unwise to remove the last trace of the diseased tooth substance, as would be deemed necessary in preparing a cavity for gold.

In order to produce the complete sterilization of such a cavity, where, to avoid laying bare the pulp, some soft tooth-bone is left, the first pellets used may be saturated with concentrated carbolic acid or a solution of chloride of zinc, and the cavity may immediately be filled without removing the antiseptic, as the material will not be injured by the moisture, or the first pellet may be dipped directly into the antiseptic, and placed so in the cavity. In this way a complete and lasting sterilization of the carious tooth-bone is achieved, which would be impossible by a simple washing out of the cavity. When I may spare the patient unnecessary pain, I have no hesitation in leaving at the bottom of the cavity a thin layer of soft (*not decomposed*) dentine over a pulp which has not, of course, yet become inflamed; moreover, I have



never seen caries show itself under such fillings, and cannot readily imagine how it could happen. On the contrary, I have repeatedly noticed how the softened dentine has become hardened. I do not say recalcified, under such stoppings. A tooth in a similar condition was exhibited by Robert Richter, of Berlin, at the fifteenth anniversary of the Society of German Naturalists and Physicians.

Tin and gold is found of very great service in children's teeth, the pulp of which has not yet become infected (inflamed). For filling such teeth a filling material is desirable by means of which we are able to prevent the further advance of caries for four to six years. In such teeth I leave gold entirely out of consideration. Cement does not possess the desired durability, much less gutta-percha, and moreover, in many instances, it is impossible to produce the dryness necessary for cement and gutta-percha stoppings in the teeth of children from three to six years of age. For various reasons amalgam does not meet with general approbation under these conditions, and many dentists refuse to employ it for milk teeth. But tin and gold may, on account of its many good qualities, be frequently used in these cases with good effect. When operating on very young and nervous patients, I only rid the cavity of the remains of food and the outer layers of the carious dentine; then I treat it with carbolic acid and immediately introduce the tin and gold, and condense with No 1 or 2. The entire operation lasts perhaps only a minute or two, if on central cavities upon the crowns of molars, and after a lapse of years, I have found such stoppings in good condition. Of course more time would be allowed for the operation in the case of elder children from six years old and upwards. In stopping approximal cavities in children's teeth, I have found cement or amalgam preferable.

There is still another contingency in which, according to Witzel, tin and gold has great advantages. I mean in cases where the teeth to be stopped are clasped by gold plates and could not be filled with gold.

In speaking of electrical processes in the mouth, I have already stated that, according to the observations made by Witzel, there arises an electrical current between the gold clasps and amalgam stoppings, and this current is conducive on the one hand to electrical decomposition of the amalgam, and on the other it liberates quicksilver, and this in turn destroys the gold clasp. Should these observations

be confirmed, it would be best to always employ tin and gold for carious teeth surrounded by gold clasps, and in which there are places where the fillings would necessarily come into contact with the gold. In cavities which extend one-half or two-thirds around the neck of teeth, tin and gold cannot be used.

#### THE COMBINATION OF TIN AND GOLD WITH PURE GOLD.

Combined with pure gold, tin and gold, as a filling material, has a wide usefulness. In recommending this here, I have to oppose the idea that it is only on account of reasons of economy. These, it is true, carry some weight, but are not by any means the principal considerations. It is, furthermore, not because fillings of tin and gold are too soft for the masticating surface. This is not the case, because when well condensed they become, after a short time, so hard that they thoroughly withstand the wear of mastication. I myself have had a tin and gold filling on the masticating surface of one of my molars for the past eight years, and it has become as hard as a rock, and has not worn away in the least. Only in stoppings on approximal surfaces have I occasionally noticed a wearing away of that portion lying towards the masticating surfaces, occurrences which I have attributed to an insufficient condensation of the material in the respective cases. In such cases better results are secured by making that part of approximal or compound fillings which borders on the grinding surface of gold alone.

The chief reason that I recommend the coating of tin and gold with gold in certain cases is, because the operation is much easier both for the patient and dentist, and the result better than can be obtained with gold alone, while, on the other hand, it avoids the discoloration of tin and gold which is so unpleasant to the eye, and in the case above mentioned gives a more durable surface. From among thousands of such fillings I have never seen one which has had an injurious electrical action upon the pulp.

The introduction of the gold plug demands depression in the centre of the filing, which depression is made with a "Rocker" or a simple plugger (No. 1, 2, 5, and 7) in the tin-gold stopping which has previously been condensed towards the walls of the cavity. For filling such cavities in tin and gold, and as a covering for the same, I use Wolrab's cylinder gold, Pack's pellets, or any good preparation of cohesive gold. I introduce the material with a plugger made

expressly for cohesive gold and then condense it with hand and mallet pressure.

Dr. Sachs, of Breslau, fills large cavities on the masticating surface of molars with tin-gold and gold in the following manner :—

After having excavated the soft part of the tooth, he covers the floor with a thick layer of Poulson's liquid cement, which may be mixed so soft that it readily flows into the cavity, a great advantage in covering an exposed pulp. In spite of this, the preparation of which we speak hardens in 3 to 5 minutes, and then forms a thoroughly firm filling, which serves as a good foundation. Then he removes the superfluous cement on the side walls, makes the necessary undercuts on the enamel rim, and lays over the entire cavity a piece of tin and gold foil of many thicknesses and about 12 mm. square. The material is so placed on the floor and in the side-cuts of the cavity with a broad plugger that it projects above the rim on all sides and completely conceals it, while the centre is still hollow. This depression Dr. Sachs fills up with gold, using for the first layer Ad. zur Nedden's crystal-gold, as this, he thinks, readily unites with tin and gold. A serrated and large instrument is necessary for this operation. In finishing the stopping, Dr. Sachs uses cylinders or foil.

In small cavities on the masticating surface of molars, Dr. Sachs frequently employs tin and gold, filling the cavity about two-thirds full with this and then stopping the centre with pure gold, as he believes this withstands wear better than a combination.

I have described the methods adopted by my colleague, Dr. Sachs, since he has been stopping teeth with tin and gold for the past ten years, and has consequently acquired much experience in the use of this material. One undoubtedly achieves in this way very fine results in filling deep cavities ; I myself, however, never make use of cement as a foundation for tin and gold stoppings, not even when the help is near.

When the layer of dentine over the pulp is so thin that there might be danger of breaking through, I place first a number of pellets in the the bottom of the cavity, which are carefully condensed without use of much force, and serve as a protection to the pulp during the rest of the operation (*See* fig 12, page 27). The rest of the operation is performed in the ordinary manner. I may add here that, in all cases of very deep and narrowed cavities, I invariably condense a certain amount of material directly against the bottom of the cavity in order to reduce the depth of the same, and then fill the



remaining hole in the ordinary way. Anyone who attempts to fill a very deep and narrow cavity with soft gold, or with tin and gold, will at once see the reason for this.

When I wish to cap a tin-gold filling, on the grinding surface, I proceed in just the same manner as for a tin-gold filling until the operation has reached about the stage represented

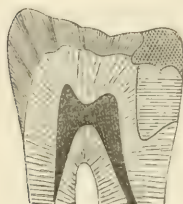


FIG. 13.

I now take instrument 1, 2, 5, or 7, place the point upon the centre of the filling and press it as near to the bottom of the cavity as possible, or I use an ordinary plugger with the mallet for the same purpose. I then fill the resulting cavity with cohesive gold, using the mallet, regardless of undercuts, since there

is not the slightest danger of the gold plug loosening. A section of the operation completed has about the appearance represented in Fig. 13.

Sometimes I condense only a few pellets in the centre of the cavity, not capping the whole surface. They serve as a wedge or key to the whole filling, and give it a somewhat better appearance. Such work may be done with exceeding rapidity and gives excellent results.

Deep pin-hole cavities I invariably fill one-half to two-thirds full with tin-gold, completing with gold.

For underfilling overhanging walls I find this method particularly serviceable. Cavities on the grinding surface sometimes have a large interior and comparatively small opening, and for some reason or other we do not find it expedient to remove the strong walls of enamel (we may call such cavities bottle-shaped). Such cavities I fill up to the neck (opening) with tin and gold, packing it with a hand instrument under the walls of enamel. I then drive a wedge-shaped instrument into the centre of the filling, thus forcing the material against the sides of the cavity, and fill up the resulting hole with cohesive gold.

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NOTE BY THE AUTHOR.—Within the last few days I have learned that Dr. Spooner, in New York, used the combination of tin and gold for filling teeth between 50 and 60 years ago, and Mr. James Lomax, of Manchester, some 40 years ago. I have, as yet, learned nothing whatever as to the manner in which Dr. Spooner employed the material, but Mr. Lomax has kindly furnished me with the following notes which will be of value to all interested in the combination we have been considering. Mr. Lomax says:—"I have, in the course of a practice extending over nearly 40 years, largely filled in this way, and have advocated the plan amongst my professional friends throughout that period. I

remember seeing fillings made by Mr. Martin, of Plymouth, some 25 years ago, but there appeared to be an excess of tin employed. I was not acquainted with Mr. Martin, and had no correspondence with him on the subject. The cylinders now so neatly made of gold and tin are useless for the purpose, the gold foil therein employed is too thin, and I also believe that the metal deteriorates by lying in contact with the tin. I believe there is galvanic action when the gold and tin lie in contact. To prepare the filling, I think the best plan is to lay a sheet of thin tin foil on a sheet of thick gold foil, cutting them into squares of an inch, and folding up as pellets at the time of using. The combination of gold and tin answers perfectly well for surface fillings, and stands mastication exceedingly well: indeed, it appears to harden by time. By using annealed gold for centre of surface, you have the same result as in a gold filling; the edges will take care of themselves. The hardening of the filling I have never been able to account for, though I have seen it thousands of time."

*(To be continued.)*

### REVIEWS OF BOOKS.

NOTE-BOOK FOR DENTAL STUDENTS (Dental Anatomy and Physiology).

By JAMES RYMER, M.R.C.S., L.D.S.Eng. London: J. & A. Churchill.

LIKE most "Note-books" and Students' Guides, this work is not intended to take the place of text-books. In this respect Mr. Rymer cannot be credited with producing a means by which the lazy student may shirk the study of his lecture notes or of his class-books. This work will prove useful, for, so far as dental anatomy is concerned, the dental student has, hitherto, practically been without any such aid. In the arrangement of headings, sub-heads, sentences and punctuation, there is room for improvement. Though the "notes" cover considerable ground, yet the whole field cannot be said to be included; neither are many points connected with several subjects worked out so fully as could be desired. The index, too, will prove useful, but it is incomplete. Notwithstanding such shortcomings as those just enumerated, this note-book on dental anatomy will be a valuable aid to the dental student preparing for examination.

LECTURES ON CERTAIN DISEASES OF THE JAWS. By CHRISTOPHER HEATH, F.R.C.S. London: J. & A. Churchill.

THESE lectures, three in number, were delivered at the Royal College of Surgeons in June last. They are almost entirely taken from the larger and valuable work by the author—"Injuries and Diseases of the Jaws." The first lecture deals with Cystic Diseases of the Jaws; while Tumours of the Jaws, and Diseases of the Temporo-

Maxillary Articulation and Closure of the Jaws form the subjects of the last two lectures. There are sixty-four illustrations.

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BRITISH AND IRISH SALMONIDÆ. By FRANCIS DAY, C.I.E., F.L.S., &c.  
London: Williams & Norgate.

SURGEON-General Day is a high authority upon fishes. As late Inspector-General of Fisheries in India he did much good work, and among the several books published may be mentioned "Fishes of India." The present quarto volume consists of some 300 pages, 52 woodcuts, and 12 lithographic plates. There are many statements of interest which cannot here be referred to, but which we hope to quote from time to time in our Gossip pages.

With regard to the dentition of Salmonidæ, Mr. Day devotes a considerable amount of attention. "The teeth in the salmon, trout, and char, are of a conical shape and used more for capturing than masticating their prey. . . . They are frequently shed and as constantly renewed by others appearing from beneath or else on one side of the discarded ones. As age creeps on, the number of their teeth become more and more reduced, the teeth-bearing portion of the bones diminish in extent more rapidly in such forms as frequent the sea than those which pass their time in fresh waters."

"The size and arrangement of the vomerine teeth are somewhat varied, as they diminish more or less rapidly in number with certain conditions, especially the character, whether saline or fresh, of the waters in which the fish live. They also vary greatly in different specimens of even the same universally admitted species, from what exists in the earliest period of their lives, when they are in a double row, to old age, when all may be absent; consequently it would be unsafe to base specific differences upon this dentition. When the tooth-bearing ridge commences to become narrower, the teeth are at first forced into a more or less irregular single line, and subsequently this ridge becomes absorbed, commencing from behind and gradually extending forwards, and the teeth as a consequence fall out."

"In the salmon the male at the breeding season has a hook, knob, or kype developed at the upper surface of the end of the lower jaw, which disappears by degrees often by the time it has become a well-mended kelt, unless the fish is a very old one, when the bony portion of this swelling cannot be absorbed. The cause of the existence of a knob on the lower jaw of male salmon and trout has



been a fruitful source of discussion from early ages down to the present day. We find that male pars or smolts, whose milt is capable of fertilizing eggs, possess no such knob, but as years pass one becomes more and more prominent. It annually augments at the breeding season, and partially diminishes in size subsequently. As age advances, that portion of the head which is anterior to the nasal valves, seems to double its previous proportional length of what is seen in the female. At first the lower jaw increases in length more than do the bones of the snout, consequently the pre-nasal portion is found to be only one half of the comparative length to what obtains in very old fish; but as the knob grows on the upper edge of the extremity of the mandibles, it is placed, when the mouth is closed, anterior to the front edge of the snout, where there is often a sore spot caused by abrasion. But after a few years the snout and upper jaw commence growing more rapidly than the mandibles, and as a result the knob becomes overlapped by the snout, and then it presses against and is received into a large depression situate between the two ascending portions of the pre-maxillaries, which are freely movable. Thus, although the hook may press against the palate, it can do so without occasioning any injury, because the parts give way before it. But should any irritation occur at this spot it might ulcerate through the soft parts, when it would appear above the snout, or on the upper profile of the head. When this takes place, movement in the upper jaw would be difficult or impossible, and the fish would, as a consequence, become starved.

"The knob appears to be entirely composed of connective tissue, so cannot fall off, but may be more or less absorbed, as it doubtless is, after the breeding season. Old females often show small knobs, and instances have been recorded in which large ones have existed, and still the fish has been fertile."

To those interested in the ichthyology of the "game fishes," this work will be extremely valuable.

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### ADVERTISERS AND THE DENTAL ACT.

*A Paper read before the Brighton Dental Society.*

By DOUGLAS E. CAUSH, L.D.S.I.

MR. CHAIRMAN AND GENTLEMEN,—In bringing this paper before you to-night, I do so with a certain amount of diffidence, for, though

the subject is one of great importance to each of us as individuals, as well as to our profession at large, yet its successful treatment I have found one of great difficulty.

Most of us, perhaps I may say all of us, well remember the hope held out by the leaders of our profession when they were honourably striving to obtain the Act, "The Dentists' Act of 1878," that was to be a panacea for all dentist ills.

The Act was to consolidate us and make us an honourable and honoured profession; the Act that was, too, to a very large extent, to do away with advertisers and advertising, and place us on a firm and prosperous footing. "Force education, and you will do away with the advertising charlatan" was the argument of those who so earnestly and successfully laboured to obtain the Dentist Act and make it law.

At the time of the passing of this Act, it was supposed there were about 2,000 dentists in Great Britain, but to the astonishment of all, nearly 5,000 names appeared on the first Register, published in 1879, and most of the additional names those of the advertising fraternity.

The passing of this Act brought many unscrupulous men to the front, and gave them the power of calling themselves dentists who, after a fashion, practised the art of Dental Surgery, to the disadvantage of their patients and those legitimate dentists who were previously working in our honourable profession. Show-cases rapidly increased, and advertisers of the worst form not only obtained money from the easily-gulled public, but who, from their want of training and utter unfitness for the position they occupied, brought dishonour upon the trained members of our profession, and the profession itself, into a measure of disrepute.

We were told time would heal much of this evil, that advertisers must die out, especially as a large number of them were men advancing in life, and that their places must be filled by those who, by their special training and study, would raise the status of the profession. It is now some nine years since the Act became law, and we may reasonably ask ourselves, Has it fulfilled the promise held out by those who worked so energetically for the passing of the Act?

The question naturally arises, Are we in a better position than we were at the passing of the said Act, and has it to any extent done away with the advertiser?

We have only to look at the daily papers, religious and semi-

religious periodicals of to-day to answer our question. We must, I am afraid, confess that the rank weed certainly grows more rapidly than the true plant, and not only does it grow, but, sad to relate, grows with vigour and flourishes, and that at the cost of the other.

I suppose we shall be all agreed that, so far as advertising is concerned, the Dentist Act has not been successful in stopping it, for there certainly appears to be more than there was before the passing of the Act.

Though some of the lower forms of advertising may have passed away, yet there is a much larger increase in a class that is more dangerous to the community at large. For with the much more plausible pamphlet, containing a certain amount of truth with a large number of disguised lies, the weed looks like the true plant, and it is often only after the patient has been enticed into their consulting rooms they discover that they are in the hands of those whose motto is, "Make money, honestly if you can, but make money."

Does advertising pay? is also a question that must have on more than one occasion passed through the minds of those present.

If we may judge from the way in which this rank weed flourishes, and if we may take the opinion of one who made it his business to call upon dentists of all classes while passing through this country, we must reply, "Yes; advertising does pay." He said the advertisers are certainly doing more in this country than those who do not advertise, and their waiting rooms are much oftener filled than those of the latter class.

There is also another form of advertising, and perhaps a much more difficult one to deal with. Its character was well defined in the *Journal of the British Dental Association* for 1886, page 700, and reads as follows:—

"The other kind of quack seems to be infinitely more contemptible. He keeps, so to speak, within the letter of the law. He does not indulge in a flaring brass plate, but is content with the modest statement of his name upon the door plate; yet notwithstanding the apparent claims to respectability, he does not scruple to enter into an arrangement on a basis of mutual profits, an arrangement involving commissions, percentages, and gifts of a notable kind at Christmas.

"No sensible man would venture to call in question the slight, graceful or even grateful acknowledgment of kindness received by



one friend from another, but what I complain of is anything in the nature of a previous arrangement or the interchange of gifts of such obvious value as to constitute a bribe to defray the expense, of which the patient must be fleeced.

FIAT LUX."

Here is a state of things which, if they exist, are far more difficult for the honourable man to deal with—difficult because one can but rarely get any actual proof of their existence—a word dropped here and there, or a half-expressed sentence, implying a great deal, yet expressing but very little, is all you can usually obtain from your informant. The reply generally is, "Mr. So-and-So is such a respectable man that he would not act in any way dishonourable to the profession," and at the same time your informant is under the impression that this form of advertising is not only permissible, but usual, amongst even the most respectable members of our profession.

If such be the case, it certainly would be very desirable to know what is the usual percentage paid, as it should be open to *all* to make the same offer to those who are ready to forward patients to the dentist for such a consideration.

I am very much afraid that there is some foundation for the utterance of "Fiat Lux" in the journal already quoted, but the question rather before us to-night is, Is it possible to stem the current of advertising, or root out some of the rank weeds? In discussing this question, there are some points that will naturally arise, and amongst them are these, How is it that quacks get patients to fleece? and How is it possible to open the eyes of the public and prevent them from falling into their well-spread nets?

We all well know the desire of the British public to make bargains, and doubtlessly this is one of the reasons why the advertiser so successfully carries on his work.

The quack to a very large extent makes his money by his mechanical work, and this oftentimes of the most crude and inferior in quality, and as a result there has sprung up manufacturers of teeth materials such as no respectable man would use. Yet these men get a ready sale for such amongst advertisers, while at the same time the advertiser will frequently obtain much higher fees for mechanical work than would be obtained by the respectable and non-advertising practitioner. While a large amount of the work sent out by these men is bad, we sometimes see cases that do credit to them, or would

do credit to any member of the profession ; but at what cost ? Fifty in some cases 100 per cent. more, has been obtained from the patient than would have been considered a fair fee.

Again by advertisements and pamphlets, frequently containing that which is untrue, yet put in such a plausible manner that the public are completely deceived, and, in many cases, at the mercy of them.

The advertising men depending so largely upon the mechanical portion of the profession seem to give us the cue as to how their pernicious influence may be to a large extent overcome. If we look at the mechanical work sent out by many of the fully qualified men, and place it for comparison side by side with that done by the advertiser, we must confess, to our sorrow, that there is not much difference. Oftentimes little or no attention is paid to the forms and colours of teeth used, and one can frequently see a lady or gentleman advancing in life with a set of teeth, pearly white and regular in the extreme, with the cutting edge as they came from the makers, attracting attention on every and all possible occasions to the fact that the individual is a wearer of artificial teeth, and that oftentimes, too, when the colour of the skin and eyes tell us at one time the wearer had a very different set of teeth. In nature we always find harmony, and nothing harsh do we find there. Let us, therefore, consider our patients, and endeavour to hide their defects by our artistic as well as mechanical skill; let our colour teeth be always brought into use, and let us not be content with a favourite colour for all cases, and certainly do not let us always use B1, 2 or 3 as a set colour ; also by adjusting the cutting edge having pointed or worn canines, and let them also be prominent or irregular, so that we may give that character to our patients that is natural to them ; but even then, I think, we must seek further for a radical and permanent cure.

In the present day there is such a demand upon our students' time and energies for operative work, that have not our examiners rather lost sight of the fact that lost teeth have to be replaced as well as those in the mouth saved ? and do they not oftentimes pass students who are capable of well filling a tooth with cohesive or non-cohesive gold who, if asked to take a bite correctly, would have either to confess their inability of doing so or trust to that untrustworthy agent, chance, for the fulfilment of that operation ?

It seems to me that, to become a successful dentist, and at the same

time overcome the power of quacks, lie in the same nutshell. Please, do not misunderstand me. I do not undervalue the capabilities of the well-taught student of operative dentistry, but because they are well-taught we find the quacks do not to any extent compete with them, and much prefer confining themselves to the other branch of the profession. Let us, then, endeavour by our work, and by using any little power we have, to raise the standard of mechanical work, so that we may break their power, and let the same gulf be between the mechanical work that already exists between the operative work of the two classes. Let the student not only have his three years' apprenticeship, during which time he should be allowed to go into the surgery to learn the art of taking impressions, bites, and adjusting cases, but by all means let him have some practical examination. Let him show that he is not only capable of taking an impression—I do not mean capable of filling a tray with composition and cramming it into the mouth of a patient—but let him show that he understands the art of taking impressions and of making a case in such a manner that the profession may be elevated by his work. If such was done, I have no doubt that by the time the Dentists' Act attains its majority a very great improvement will have taken place in our ranks.

Before concluding, may I draw your attention and earnest consideration to our *Register*, the only acknowledged legal document of our standing and position ; yet, even in this, how faulty are its records.

In this present edition we have the name of one chemist who has left our town and country for years, and whose business has been sold two or three times since to young men, some of whom have done extractions under their predecessor's name. Again, we find men whose names have been on the Students' List for years ; some even who have taken their L.D.S. This ought certainly to be altered. If the pass lists from the various examining bodies were sent to the registrar, there could be no difficulty in taking away the names from that list—those who have finished their hospital courses. Again, some have been students far beyond the prescribed time. Ought not these, after a certain number of years, to be removed, because their actual student days are over ? It seems to me that the register should be divided into five divisions :—1st, Qualified men ; 2nd, Non-qualified men ; 3rd, Those practising dentistry with pharmacy, &c. ; 4th, Assistants ; and lastly, Students. Were this done, we should at a glance be enabled to see the true position of our profession, and it



would, I am sure, tend to the raising the status of dentistry. In every large town, also, societies such as our own should constitute themselves Vigilance Committees, and be constantly in communication with the registrar in cases of death or men coming into the town, and as continual dropping will wear away even the hardest of substances, so if we continually brought the matter to the front we should, I am certain, have a *Register* that would at least be correct and would enable those who have to use it outside our profession to see the true standing and position of any member at a glance. Thanking you very much for your kind attention, trusting the paper will produce much discussion that may be for the profit of all; and, in conclusion, may I say that in the first *Register* there were published the names of 39 students, and in this year's *Register* no less than eight names of the original 39 now figure on the Students' List.

Surely this should be altered, and it should be made compulsory for a man to place his name on the *Register* as soon as he has taken his degree.

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### EDINBURGH DENTAL STUDENTS' SOCIETY.

At the December meeting of the Edinburgh Dental Students' Society, WILLIAM WILSON, M.B., C.M., L.D.S.Edin., &c., President, in the chair, Mr. G. W. Watson, L.D.S., gave a lecture on "Secondary Hard Formations in the Pulp Cavity," illustrating his subject by drawings on the black board, micro-photographs and numerous specimens.

He divided them according to their anatomical structure and peculiarities into varieties: (1) Nodular calcification—Intrinsic Calcification: (2) Dentine of Repair—Dentine Excrescence; (3) Osteo-Dentine; (4) Granular Calcareous Deposit.

He pointed out that the first mentioned, especially the nodular varieties, might be of purely physiological significance at one time, while at another, from certain causes detailed, it might become pathological. Dentine of repair he showed to be compensatory tissue formed as an effort of nature to limit disease or injury, and is always deposited in proportion to the extent of injury or disease.

Dentine excrescence he maintained to be pathological, detailing cases and exhibiting specimens in illustration; very severe neuralgic pain being a common accompaniment of this condition, which is found as frequently in sound teeth as in diseased. In

regard to osteo-dentine, mention was made that the dentine was developed from the odontoblast cells, while the osseous tissue had its origin from the connective tissue of the pulp. The last variety, granular calcareous deposit, was purely degenerative, and commonly associated with atrophy of the pulp.

The percentages of the different varieties found in 1,000 teeth examined were given in detail at the close.

At the January meeting of the above Society, Mr. Gerard Black, L.D.S.I., gave a paper in which he advocated the more general adoption in practice of "Crown and Bridge Work." There were also exhibited models of interest. Mr. Campbell, of Dundee, contributed one showing a conical supernumerary tooth between the two central incisors, and Dr. Wilson and Mr. Page showed specimens of lateral incisors belonging respectively to the permanent and temporary series, each having a most strongly developed singulum.

### ODONTO-CHIRURGICAL SOCIETY.

#### SOME REMARKS WITH REGARD TO ARTIFICIAL CROWNS.

BY DR. WILLIAMSON.

*(Continued from page 35.)*

#### METHODS OF ATTACHMENT.

THIS part of the subject might easily be developed into tremendous proportions, as dental ingenuity would seem to have been exercised to its utmost in the endeavour to devise an ideal method by which a crown may be attached to a root.

There are probably some seventy or eighty methods, or variations of methods, and in each one of these there is some objectionable feature or features; the reason being, as in many other things, the difficulty of combining all the desirable qualities, which may be classified as follows:—

1. Natural appearance of crown.
2. Perfect fixity and strength of attachment of crown to root.
3. Preservation of root from decay.

To accomplish these principal ends, varieties of two methods have been employed, (1) attachment by means of a pin in the root; (2) attachment by means of a collar or band encircling and fitting the end of the root, generally combined with the use of a pin.

I will not enter into the various details, but merely make a few remarks in regard to those methods that I have had some experience of, and, to do this, the best way will be to make a division of the

teeth into two classes—(1) Incisors and Canines ; (2) Bicuspid and Molars.

1. *Incisors and Canines.*—This is the class that we are most frequently called on to treat in the way of artificial crowns, and where there is most reason for the operation, because towards the front of the mouth the alternatives of a suction or clasp plate are both objectionable, the former from its bulk, and the latter from the probable injury to the teeth in the case of a careless person, and from the difficulty of concealment of the fastenings in some cases. The loss of a front tooth is a very potent way of bringing the patient to the dentist, especially with ladies, because of course the vacancy is so unsightly, and for this reason some little trouble should be exercised in order to obtain a substitute of natural shade and colour. In many cases this is a most difficult matter, and to me sometimes a worrying one. Even with a large stock to select from, there are various causes which increase the difficulty, as, for example, in the case of a lateral, where there is the different shade of the adjoining teeth, the light shade of the central and the darker one of the canine, the lateral being selected approximately more to the central. Again, where teeth are discoloured by approximal filling, it is difficult to make an artificial tooth appear natural beside it, except by colouring it on the same side to match the stained one. This is one of the most useful ways in which the method of tinting teeth, lately introduced, can be employed, affording a means of gradation from the natural to the artificial, not obtainable otherwise, and I have employed it in several cases with advantage. An extra deep shade of grey or blue on one side of the tooth, and shaded off towards the centre, is a very effective means of concealing the transition. I had a case lately where a central incisor had to be replaced, the other one being stained a peculiar shade of yellow, as the result of an old injury. There was one tooth among those I had which was a fair match, but, being too short, I sent to a London house for a selection to match this colour. A score was sent, but none that could be called very near it, so the only resort was the painting method, which, after a number of trials, yielded a very fair approximation to the colour desired. There is one caution in regard to those painted teeth, and that is, they should be protected from the action of acid when the metal portion is boiled in it. Some of the colours seem to be affected by acid more than others. As to



wear in the mouth, as far as I have seen, they stand very well. The fact of the not infrequent difficulty of selection of colour and size together is often so great, even with the assistance of the painting process, as to be, in my opinion, a fatal objection to the use in the front of the mouth of special crowns, such as the Bonwill, Howe, Weston, Logan, and others. Without sufficient compensating advantages, it is not worth while for any ordinary practitioner to keep a large number of any of these forms in order that he may find a suitable one for any particular case, for even then he may be at a loss for one; for instance, I noticed in the report of a New York clinic, held the other day in a dental depot, that the operator who was to set one of these special crowns could not proceed because he could not obtain one adapted for the case in hand. A plain tooth, then, is, generally speaking, the best form to employ, as it gives the greatest opportunity of fulfilling the primary object of a natural appearance, and if broken, can be readily replaced. As to the methods of attachment, I used at first the old method of a gold pin, with silk covered with varnish, and forced up into the canal. This method, although old-fashioned, is not to be despised in the case of a sound root, and not a few in this country still think it one of the best—an opinion which would seem to be confirmed by the cases one meets with where such a tooth crown has lasted for many years. Still, in spite of some favourable cases, I do not continue its practice, as I always felt a degree of uncertainty as to whether, when the tooth was actually in position, it was tight enough, and if there was rather too much silk on the pin then it would not go far enough, a state of things not easy to remedy.

On the Bonwill crowns being brought out, I tried a few of them in cases of the first class, but did not find them very satisfactory, there being several causes of failure. The first one I used was in the case of a young clergyman who had a badly decayed canine root. The crown was set with amalgam, the pin used being the strongest form, of an elongated triangular shape, and the operation was in every way satisfactory; but three months afterwards he came with the tooth broken off, the pin having given way right through the angle which is the thickest part. Another one, a lateral, lasted three years, but, in this case, the lateral pin being very small, the strength lay in the amalgam. A central lasted about the same time, and finally the tooth substance broke at the back part of the ring, the weak part in all those of a similar

pattern, because the crown is more or less weakened according to the amount of fitting required, and also in the case of a close bite, where it requires grinding on the lingual side. In regard to the Bonwill pins, it is but fair to say that those I used were of the first pattern. Since then they have been made without serrations and of greater strength.

My next experience was with the system best known as Balkwill's, from his having devised a set of instruments for the performance of the operation by means of a tooth soldered to a plate fitting the top of the root, and this again attached to a split platinum pin, which is forced up into a platinum tube screwed into the root canal. This is the method I have used most in cases of fresh sound roots, putting on first some low grade gutta-percha on the root side of the plate, gently warming it over the spirit lamp, and then pressing it up into place, and of course trimming off the surface with warm instruments. It is one of the few methods that permit of the removal of the crown entire, but at the same time the pin must not fit the tube too easily, otherwise it will soon loosen. The quality of removability has led to its employment in removable bridge work. What I find most troublesome is the preparation of the root for the screw tube, the tapping being a slow process, and apt to give the patient the idea of the preliminary stages of root extraction by means of the screw, owing to the tap not cutting readily enough to prevent a series of partial rotations of the root along with it. However, if the root is healthy, no trouble seems to be caused by the strain imposed in this way. People in my part of the country seem to have a general idea that pivoted teeth are screwed in, a peculiar accent being given to the word, which seems to imply some notion of great pain accompanying the operation, and so, partly for this reason, although it is not really more disagreeable, I would prefer to avoid the tapping process, and I do not know that it is really necessary, as what will do probably as well is a tube, roughened on the outside by a bit or two of wire soldered on, first fixed in the root with a little oxyphosphate towards the apex, and then, say, the other half packed round with amalgam, the calibre of the root canal having been enlarged to allow of it being inserted with ease and certainty. Not only is this method applicable for sound roots, but especially for cases where there is a deficiency of the root substance at the sides, perhaps where the gum has had to be pressed out to expose the

surface. The missing wall may be built up with amalgam retained by a groove on both sides, aided by the screw thread or roughened surface of the tube.

In cases where the root is very much hollowed and enlarged, as in those caused by the patient having worn an ordinary gold pin with plenty of silk on it, but where there is no deficiency at any of the sides, then I think a crown and pin set with oxyphosphate is the best treatment. The tooth is attached to a strong platinum pin, as long as the root will allow. To strengthen and give the necessary roughness, I used little wings of metal soldered to the pin, but lately have adopted the method described by Dr. Meriam in the *Cosmos*, of putting a spiral of wire round it, soldering with gold. Two or three breakages of the pin had previously occurred when I used the ordinary gold pin, very slightly nicked, as holdfast for the cement. The plate covering the root should be fitted closely over the edges, so that nothing but the slightest line of cement may be exposed. Where the root has not been hollowed to the edge, I think it is best to cup the top of the root, so that there may be a fair body of the oxyphosphate close to the edge all round; otherwise, if squeezed out between two flat surfaces, the thin wafer thus produced is apt to be disturbed in the trimming up, especially if the operator is at all hurried, or it may become broken up and disintegrated afterwards, leaving a distinct place for the lodgment of *debris* behind the plate and the top of the root. This method is at once very simple, and in suitable cases very satisfactory. When the tooth is ready to be inserted, the root should be thoroughly dried and ready for the reception of the oxyphosphate: not too quick-setting, a portion of which should first be put up the root and another portion round the pin and under the plate, taking care that every part is covered to some extent with it, which will ensure the surplus cement being pressed out equally all round. At the moment of writing I recall one case of a very hollow central set some six years ago, and seemingly as good to-day as then; a similar root filled with amalgam would, I imagine, have a strong tendency to necrosis.

The above are the principal methods employed in treating cases of the first class, namely, incisors and canines.

2. *Bicuspid and Molars*.—In crowning these teeth I have done comparatively little, in fact I have not gone further back than the bicuspid, and it is to these teeth I will therefore confine my remarks.

With them there comes more often than any other the question of retention of part of the tooth ; thus it is of common occurrence to find the outer cusp broken off and the inner one left. This some advise retaining, fitting a canine tooth to the outer edge, soldering it to a post and filling round it with amalgam, using the inner cusp as a retaining point. The retention, however, of such portions does not seem to me desirable in almost any case, the result not being so strong as in the case of complete removal, and the operation itself is generally more difficult. Unless a very large part of the cusp is left, it is considerably weakened by anchorage for the amalgam. There is also difficulty where the crown is not a large one, as in a case of a lady I had some years ago, when I set the post in the root with Weston's cement, and built up the remainder with amalgam, but it was no easy matter, on account of want of room, to pack it round the post and between the natural and artificial cusps. It happened in this, as it happens in similar cases, that the natural cusp broke off, while the artificial one remained, showing what is really the weak part in such an operation.

There can be little exception taken to the Bonwill crown, or some of the slight modifications of it, for use in the case of bicuspid. Where the bite is close, of course they are not suitable, but where there is a fair amount of room they serve the purpose well, being strong and easily adjusted. For these crowns, amalgam of a quick-setting order is the best material to employ, using either the ordinary Bonwill pins set to the roots, or what I prefer, especially in shallow crowns, the Howe screw post with nut. When the latter is used it is advisable to take the Howe dovetailed crown, which has a large opening for the reception of the nut. The root is first tapped in the centre and the post screwed in, amalgam is then packed round it over the surface of the root ; then the crown is slipped over the post, and some amalgam having been packed round it, the nut is screwed up and covered with more amalgam. It is not always possible, when the bifurcation of the roots occurs not very far up, to get sufficient anchorage for the screw, and in the endeavour I went through in one case, without, however, any harm resulting, the hole being covered with a gold cylinder dipped in strong carbolic, and the screw was put in deep enough to hold quite well. In fact, the Howe screw, which has a sharp cut with shallow broad space between, holds with remarkable strength in dentine, and the short pieces cut off serve the purpose of retaining screws



for contour fillings. On one occasion I found this screw nut method very useful in the case of an upper canine, which helped to support a plate. The crown was broken off and the root was exceptionally small and short, so I put in a screw post and a crown with a large opening in it, into which the nut went. It has now served the purpose well for two years.

Where there are two distinct roots, the plan of a closely-fitting cap with two platinum pins, roughened as before described, and set with oxyphosphate, is an excellent one in many cases, especially in those where the bite is close, and will not admit of an ordinary shaped crown. A gold cusp may also be built up to any height to suit the hole. Theoretically, at any rate, a band or collar might be used in many cases of bicuspid roots, but as I have had no practical experience of their application, I forbear to say anything further in regard to it, but will leave it to those who have employed it or have seen the results of the practice. I am sure we should like to hear from our American friends, shall I call them, who may be able to speak from what they have seen of the extent of this practice, and whether many practitioners are opposed to it, as certainly some are.

It may be seen now that, as I am beginning to speak of methods I know not of, I am tending to stray beyond the limits I commenced with, so it will be wiser for me to bring these somewhat discursive remarks to a close. I only hope they may have been of some interest to you, and that you will freely give your own experience in the discussion.

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### ODONTOLOGICAL SOCIETY.

At the ordinary monthly meeting, held on December 5th, 1887, Mr. CHARLES S. TOMES, F.R.S., President, in the Chair,

Mr. Brunton, of Leeds, exhibited specimens of absolutely pure hydrochlorate of cocaine which had been obtained from a Leeds firm. He believed the absolute purity of the drug exempted it from many of the dangers of cocaine administration; in the cocaine commonly used as much as five-sixths per cent. of impurity existed. He also exhibited a perfect matrix and universal matrix clamp. The clamp is worked by a key with a right angle attachment which is removable, allowing adjustment in any desired position.

He showed a model exemplifying the way in which the clamp

and matrix could be adjusted. He also desired to bring before their notice a specimen of Mushat steel, which is much harder than the steel in common use, being only soft when raised to a red heat. He thought some dental instruments might with advantage be constructed of this material. His last specimen was the model of the mouth of a boy, which showed six incisors in the upper temporary set. This model he presented to the Society's Museum.

Mr. Storer-Bennett showed an unusually large odontome. This growth had been removed by Mr. J. Lloyd, of Birmingham. The odontome weighed before section two hundred and forty-seven grains.

Dr. Elliott exhibited a new hand-piece which he claimed had the following advantages. It is detachable from the cable and sheath by moving a slide, and as rapidly replaced. The interior mechanism consists of a chuck used only for centring, and a cock-pin (the old S. S. White No. 4) combined, so that slight motion of the ring on outside of case fully releases the bur, which at other times is held truly and firmly. Provision has been made for taking up wear.

Dr. Elliott also exhibited two right angles to go on cable instead of hand-piece, one with spring chuck in which the bur was at once released by pressing with the finger a spring opposite the bur; this had been in use five months, and the bur had never fallen out during that time. Also another form, in which the Hodge and S.S.W. right angle were combined.

Dr. Elliott also showed a new straight and R.A. engine mallets, each striking two blows to one recoil; these have entirely replaced the electric mallet in his practice, making when driven by the gas engine 6,000 blows a minute, the electric making 4,000.

Dr. Elliott also described a modification he had made of the Rollo Knapp Blowpipe. The improvement consisted in making it self-contained in a small box slightly larger than the gas bottle.

Mr. PENFOLD showed a sample of the fluosilicate of sodium, or Salufer, as its patentee, Mr. W. Thomson, F.R.S.E., of Manchester, had named it; it was non-poisonous, non-irritant in solution, but powerfully antiseptic. The following is an abstract of a paper

#### ON SOME CASES OF CONGENITAL FISSURES OF THE MOUTH.

Read by J. BLAND SUTTON, F.R.C.S.,

*Honorary Member of the Society; Hunterian Professor Royal College of Surgeons, England; Assistant Surgeon, Middlesex Hospital.*

In 1867, Sir William Fergusson, in his well-known lecture on

Hare-lip and Split Palate, states "that hare-lip in the human subject bears no resemblance to that of the hare. In this animal it is invariably in the middle line; in man it never is." Among the many cases which this surgeon saw, none were in the middle line.

Mr. Holmes, commenting on this statement, amends it thus:—

"The natural cleft in the lip of the hare differs from the unnatural cleft in the human lip in the important particular of being in the middle line, which the human hare-lip never is, or so rarely that it may practically be said never to exist."

It is also equally noteworthy that in hare-lip occurring in mammals the cleft is commonly situated to the right or left of the median line.

A similar condition is present in the lip of the lamb presented to the Museum of the Odontological Society by Mr. Willoughby Weiss. In this specimen the fissure is on the right side. Although one would imagine hare-lip to be fairly frequent in the lower mammals, to judge from its prevalence in the human kind, nevertheless the two cases just mentioned are the only actual specimens I can refer to at the present moment, and no other recorded cases are known to me.

Median hare-lip, however, occurs in the human subject, and the specimen, for which I am deeply indebted to the courtesy and kindness of my friend, Mr. Frederick Treves, establishes this beyond all doubt.

On examining the child before its death, I felt convinced that there was no ethmo-vomerine plate, and this conviction was strengthened by the peculiar shape of its forehead. When the child died, this opinion was fully confirmed; there was no ethmo-vomerine plate, consequently no nasal septum, and, what is more important, the premaxillary bones were absent. The bearing of this peculiarity will be recognised when we come to discuss the embryological features of these fissures.

In the summer of 1866, whilst staying in Paris with my friend, Mr. W. H. Freeman, of Bath, we noticed some pug dogs, kept as fancy pets, with remarkable clefts in the upper lip and nose. A bitch was purchased, and at Bath Mr. Freeman had her crossed with a Skye-terrier. The result was successful; half the pups presented well-formed lips and noses, the other half had cleft noses like the mother.

The deformity consists of a median vertical split involving the

upper lip, extending some distance between the nostrils, and passing between the incisive bone, opens on the hard palate.

The defect is of great interest; for median hare-lip is excessively rare, and even in the hare the mesial cleft is confined to the lip, and does not involve the nose. It is also interesting in that it serves as a good example of a defect being transmitted until it becomes an established condition. It is very difficult to explain, on the ordinarily received opinion regarding the development of the nose and upper lip, how this defect comes about. An examination of the lip of a normal dog, however, shows that the cleft, or cicatrix, present in the dog's upper lip, extends some distance along the nasal septum. Hence it is possible that we have in this case to deal with an arrest of the coalescence which normally takes place in this situation.

Equally true is median fissure of the lower lip, not only in man, but in mammals. Sir William Fergusson figured an example of this defect, the only one he ever saw in his exceptional experience of these cases.

An excellent example of median fissure in the lower lip, involving the symphysis and tongue of a calf, has been placed on record by Dr. Joseph Walker. A very remarkable specimen is recorded by Lannelongue. It was observed in a child two years and a-half old. The split involved the lower lip, and between its edges a tumour existed. This was removed, and the edges brought together. The lower incisors were natural.

Judging from the figure accompanying Lannelongue's account of the case, it would seem to be a dermoid, and to that variety to which I have applied the term sequestration cyst.

Before proceeding to discuss some points connected with the development of the parts under consideration, we must study yet another example of abnormal fissure, viz., *macrostoma*. This congenital defect is due to failure of union, partial or complete, of the mandibular fissure beyond the natural limits of the mouth.

Through the courtesy of Dr. Rayner and the kindness of my friend, Mr. John Palmer, I have been able to study and exhibit a remarkable specimen of this rare defect.

In this instance the child, when born, was found to possess an unusually large mouth, the angles of which gradually passed into a red cicatrix. This scar in its turn ended in a gaping recent wound over the temporal region extending over to the dura mater. The condition was symmetrical.

The impression left on the mind of those who saw the case was,



that the injury had been caused by a tight amniotic band engaging the mouth at the time of birth and impending delivery, especially as the nurse's attention had been arrested by a strong cord-like piece of amnion. This opinion, however, cannot be entertained.

Recently, through the kindness of Mr. G. Seymour, an opportunity has been afforded me of studying a very interesting instance of what may be considered the mildest form of the defect. The patient, a little girl aged seven years, presented on the right side of the cheek, an inch and a-half behind the angle of the mouth, a small depression surmounted by a tiny cutaneous nodule. The depression in the skin was about one-sixteenth of an inch deep. Corresponding with this, on the mucous membrane of the mouth, was a white cicatrix one-fourth of an inch in diameter.

On the left cheek, an inch and a-half behind the angle of the mouth, is a small congenital cutaneous elevation. The pinna on this side is very defective, and as far as my examination extended, the external auditory meatus is covered with skin; but I do not think the meatus is completely occluded, because the girl has some hearing on that side.

The case is one of extreme interest, and may be interpreted as follows:—

The dimple on the right cheek and the nodule in the left one result from the faulty closure of the edges of the mandibular cleft, in the same way that imperfect coalescence of the branchial fissures leads to the formation of cervical branchial fistulæ.

Macrostoma is, as has already been mentioned, frequently, but by no means always, associated with defects of the auricle. It is of great interest to find in this case the defects in the line of the mandibular cleft associated with an abnormal auricle.

As far as my knowledge of the literature of this subject extends, this is the only recorded case of a congenital depression in the cheek allied to branchial fistulæ.

Some amount of new light appears to have been shed on this matter by His's careful investigations into the anatomy of early human embryo. This writer's account is somewhat after this fashion:—The mouth in a human foetus of the fifth week is represented by an opening from which five fissures radiate. The upper pair are the orbito-nasal, the two lower form the mouth, whilst the median fissure separates the lower jaws. As the median process developes to form the nose, two rounded prominences make their appearance at each

angle. These may be referred to as the globular processes. From the globular processes the alæ of the nose and intermaxillæ are derived ; later they are joined by the lateral pieces to complete the lip.

He further points out that in some mammals, especially the rodents, the globular processes do not fuse together, but are permanently separated ; whereas in man they always fuse together in the middle line, but are not so constantly joined by the lateral pieces.

These facts are of value, inasmuch as they afford a ready explanation of the occurrence of median hare-lip in the lower mammals, but its extreme rarity in man. When it occurs in man it is due to an arrest of development of the globular processes. Hence we may fairly infer that, in the variety of pugs already referred to, the globular processes habitually fail to coalesce in the median line. It is open to question whether the globular processes owe their origin entirely to the fronto-nasal plate. The case of median fissure, which has been mentioned, would seem to show that the premaxillæ arise in connection with the ethmo-vomerine plate, and that the skin covering them is derived from the fronto-nasal plate ; for in that specimen the alæ nasi are well-formed, but the premaxillæ and septum are absent.

Hare-lip in man is not necessarily accompanied by a split palate, but if cleft palate is associated with hare-lip, the cleft involves the entire palate. If His's view concerning the globular processes is correct, then it would be expected that hare-lip could be associated with a cleft involving only the premaxillary bones.

Whilst studying these abnormal fissures about the mouth, a marsupial embryo (*Macropus*), which could only have been in the pouch two or three weeks, came under my notice, and the condition of its mouth is so interesting that I have had it drawn. It presents a median cleft in the upper lip, which differs from the hare's cleft in that it involves the premaxillæ exactly as in the case of the dog. Further, there is a shallow median fissure in the lower lip. A similar condition exists in the lips of all early marsupial embryos I have been able to examine (*Macropus*, *Halmatura*, *Phalangista*, *Petrogale*).

It may be briefly stated that the fissured lip of the calf and lamb are the result of non-coalescence of the globular processes with the lateral bars which form the lips and maxilla. This, of course, applies to such cases in man. The fissure in the lip of the hare is due to the

non-coalescence of the globular processes with each other, an event quite normal in this mammal, as in rodents generally; in the case of the pug, with median cleft in the lip and nose, the failure of union between these processes is a defect hereditarily transmitted.

Macrostoma is due to failure of union in the posterior part of the oral cleft, whilst the median cleft in the lower lip, an event of very rare occurrence, is due to some cause preventing the mandibular bar from fusing in the median line.

A paper was next read on

#### THE PATHOLOGY OF ALVEOLAR ABSCESS.

By E. LLOYD WILLIAMS, M.R.C.S., L.R.C.P., L.D.S.Eng.,

*Assistant Dental Surgeon, London Dental Hospital.*

#### DEFINITION.

The term alveolar abscess has been used so loosely amongst dental surgeons, and its pathology so variously understood—at least, if we can gauge the latter point from observations of common practice—that it would be extremely hazardous to analyse the various opinions entertained, and attempt to strike a mean which might fairly be said to represent the average opinion. Under these circumstances, it becomes difficult to attempt a definition within limits at once exact and comprehensive. I think, however, that I shall not trespass far afield in submitting, that “alveolar abscess is a circumscribed collection of purulent material as one of the results of inflammation of the alveolar-dental periosteum commencing around the root or roots of an individual tooth.” This definition may appear at first to be somewhat arbitrary, if not sufficient; but it has at least the merit of cutting off a variety of suppurative affections, ranging from mercurial periostitis to Riggs’ disease, and should prove acceptable if only on the ground that it thus narrows down the subject within the practical limits of a short paper.

#### ETIOLOGY.

In the vast majority of cases, the cause may be distinctly traced as a sequence of the death of a pulp, and a direct spread of inflammation from the point where the vessels at the apex of the root of tooth are in immediate relation with the dental periosteum. And, inasmuch as the death of a pulp usually occurs after exposure to the external air, it is impossible in such cases to exclude the septic origin of the initial periostitis. But abscess may ensue on the death of a pulp after traumatic injury without access of air, and here the causation becomes

more difficult to determine. And there is yet another form—idiopathic abscess—which is far from uncommon, where there has been neither exposure of pulp or traumatic injury, and the tooth itself is apparently sound and normal in colour. This latter condition, which is probably due to nutritive changes which are difficult to trace, was well illustrated in a mouth which I once examined, where a lady about twenty years of age had three typical sinuses apparently in connection with the sockets of three lower incisor teeth to all appearance sound and healthy. Further interest was attached to the case from the fact that the patient stated that she suffered from a similar state of the mouth for several years during the spring. The condition passed away in a short while without active interference, and did not recur up to the time I lost sight of the case.

In a tooth where pulp has died as the result of a blow, without access of air, the pulp itself may or may not be found to be in a state of putrefactive decomposition. My own experience leads me to believe that in the majority of such cases a septic condition exists, and on this point I am compelled to differ from Mr. Charles Tomes, who brought this interesting subject before the Society some little while back. It is by no means uncommon for suppurative collections in different parts of the body to be found in a stinking condition, an analogous state of things, which is worthy of passing note, being found in cases of abscess in bone where the pus is foul and greenish in colour. The precise relation of organisms to the processes of putrefaction and fermentation is a subject which excites much variety of opinion amongst modern pathologists. Believers in Pasteur's germ theory think that these processes are induced by organisms; whilst those who object to this theory contend that putrefaction and fermentation may be initiated without the presence of bacteria, and that the organisms themselves are generated from the organic constituents dissolved in fermentable fluids. If the latter theory should prove correct, then the occurrence of putrefaction in a pulp which has broken down without being exposed to the air is but a normal pathological condition. On the other hand, if the germ theory be true, it is not difficult to believe that tissue whose vitality has become lowered, or altogether destroyed, may cease to resist the putrefactive influence of germs which, it is quite possible, may exist in normal blood, even though they be difficult of demonstration. Experiments have been made on animals by feeding them on phosphorus and thus lowering their vitality, and in these cases



micrococci have been distinctly traced in the blood. That the blood under certain conditions is capable of circulating infective material is now generally accepted, as instanced in *septicæmia* and *pyæmia*, and that the blood may harbour hæmatozoa has been demonstrated beyond cavil in the peculiar tropical disease known as *chyluria*.

There is another point with regard to the possibility of infection from another source, which is suggested by a statement made at the last annual meeting of the British Dental Association by the President, Mr. Brownlie, who unhesitatingly affirmed that a tooth is not in itself water-tight. I cannot personally endorse that statement ; on the contrary, I believe that to be entirely erroneous, although I have not yet had the opportunity of carrying out a sufficient number of experiments to disprove the suggestion. If, however, a tooth in its normal condition does leak, another source of infection from the fluids of the mouth becomes easily conceivable.

#### VARIETIES AND CLINICAL CHARACTERS.

The principal varieties of alveolar abscess may be characterised as (1) *acute* and (2) *chronic*.

(1.) The term *acute* as applied to an abscess of any description, is indicative of an intense form of inflammation, generally dependent upon an injury whose action is short in duration and severe in character. Perhaps the commonest cause of acute alveolar abscess is a sharp attack of inflammation followed by its death. Clinically, it is characterised by an intense inflammation of the alveolo-dental membrane which extends to the adjacent alveolus and gum, and may largely infiltrate the overlying and continuous structures. The inflammatory process seems to focus itself somewhere near the point of initial injury, and the abscess generally bursts on the surface of the gum in the immediate neighbourhood of the offending tooth. In a favourable case, when the pus is evacuated either by nature or the surgeon, the inflammatory action generally subsides gradually, and resolution of the remaining products appears to take place. In a less favourable case the acute passes into the chronic stage.

(2.) *Chronic* alveolar abscess is much less intense in character, is often slow in asserting itself, and is generally consequent on the death of a pulp. It may develop with little or no pain, and often only proclaims its presence in consequence of treatment of a pulpless tooth. A limited area of inflamed tissue within the socket ultimately breaks down, and the discharge, which may vary in character, seeks

the surface by way of an empty root-canal or by a sinus through the overlying alveolar plate, opening by a papilla-like orifice on the gum. More rarely, the pus may find vent by passing between a detached periosteum and the tooth, thus gaining the surface at the margin of the gum. An abscess of this description may go on for an indefinite time, and seems to be capable of taking on alternate periods of activity and quiescence. Chronic abscesses in other parts of the body occasionally cease to discharge when the irritation causing them terminates, and they may diminish by absorption of their fluid components—whilst the solid elements become dried up and shrunken into a putty-like mass. They may remain in this state without giving rise to any trouble, or they may again become the seat of suppuration, and form what Sir James Paget has termed “residual abscess.” A similar state of things in a modified form may happen in the mouth, and it is far from uncommon to note instances, which, I think, may be appropriately called “residual alveolar abscess.”

The area of inflammation is generally limited, but the ultimate sequæ may be serious, involving necrosis of bone and destruction of the soft tissues; whilst the pus may eventually burrow through a track which often opens at a great distance from the socket of the errant tooth. As an instance of destructive inflammation of this kind, the specimen handed round is a good example, in which necrosis of the superior maxilla extended from the upper canine to the wisdom tooth on the same side, involving the floor of the antrum, as the result of a chronic alveolar abscess in connection with the fang of the first bicuspid tooth. As an instance of the burrowing of pus from a chronic abscess, of which there was absolutely no evidence in the mouth, I may mention a case in my own practice where a canal stood out in contour on the neck of the patient about the size of a goose quill, and eventually bifurcated, each branch ending in a pouch about an inch above the clavicle, which, when full, discharged itself by ulceration of the skin.

But however interesting it might be to discuss fully the clinical aspects of the subject, it is not within the scope of the present paper; but rather to confine your further consideration to the purely pathological phenomena of ordinary cases. And, to this end, I would ask your attention exclusively to the changes which occur in the various tissues involved.

First of all, we may consider the alveolo-dental periosteum, which

plays a prominent part; and, inasmuch as the changes which take place may be studied with greater facility in chronic affections, the latter type of inflammation will be taken as illustrating the various processes which I propose to examine. The membrane itself is, as you know, composed of connective tissue of a moderately dense character, and the ordinary primary stages of inflammation common to this type of tissue are in no way different from those which occur in the alveolo-dental membrane. We will, therefore, pre-suppose the infiltration of the tissue with leucocytes. This inflammatory process may end in (1) resolution, (2) organization, or (3) suppuration.

1. *Resolution*.—There is no reason to suppose that this process is uncommon in the alveolo-dental membrane, although it would, of course, be difficult to produce histological specimens—for obvious reasons. We are clinically familiar with cases of threatened abscess which disappear rapidly, where, no doubt, the primary stages of hyperæmia and infiltration do occur, only to be followed by the fortunate removal of the inflammatory products.

2. *Organisation*.—Failing resolution, the new cells with which the tissue is infiltrated become organised into a new tissue. This "productive" action is common in chronic inflammations, and is dependent on a low degree of inflammatory action. The process of organisation is demonstrable to the naked eye by the palpable thickening of a membrane which often retains its attachment to a tooth when extracted, and it is under these conditions that we are enabled to study the changes that occur. On making a section of a thickened periosteum, there are one or two things which enforce their identity upon us before making a minute examination. The first is, that the original oblique direction of the fibres is lost, and in its place the new fibrous tissue lies parallel with the root and its socket. The second is, that the intensity of the inflammatory action has been confined to the lower third (or apical portion of the membrane). And the third is, that although the membrane may be variously affected in various degrees, yet no part entirely escapes the inflammatory action. The new tissue, if examined more minutely, will be found to be of two principal varieties. That which is more highly developed is fibroid in character; it is dense in structure, and consists of closely-packed wavy fibres in which spindle-shaped elements figure conspicuously. A less highly-developed structure consists of a loose meshwork of adenoid character. In the early stage, some of the larger cells range themselves round, and enclose groups of smaller cells; later on, the

walls become condensed and fibrillated. This latter tissue is constantly present in low inflammatory conditions, and is often associated with teeth which are the subjects of periosteal irritation whilst their pulps are still in a healthy condition.

With regard to the degenerations which may occur, one would naturally look for a fatty change; but although this is quite possible, I have been unable to trace a single instance of fatty degeneration. Caseous degeneration is not common, but I have come across evidences of it in a few specimens.

(3.) *Suppuration*.—When the inflammation is intense or prolonged, the leucocytes accumulate in sufficient numbers to form pus, at the expense of entirely destroying the tissue at that spot. This is what has already been referred to as the “breaking down” of tissue. The old idea of an alveolar abscess—and one still tenderly nursed—was that a pyogenic membrane was formed which had a special function of secreting pus, the latter denuding the fang extensively. Even now the enlarged periosteum often clinging to an extracted root is looked upon as the wall of an “abscess sac,” and this wall is mysteriously connected with any purulent discharge in the neighbourhood. We all know how a chronic alveolar abscess may take on active inflammatory action with the result of a large accumulation of pus, but, as a rule, the action is of a low type, and the area of tissue broken down is comparatively small. I am compelled to disagree with the usual account given in text books about the denudation of fangs which are supposed to be bathed in pus as a regular thing. In extreme cases where the hard tissues are undoubtedly necrosed (in the true sense of the word), the fangs will of course be in actual contact and be largely denuded; but that this is a common factor in ordinary cases I deny altogether. Pus is supposed to be endowed with the power of absorbing the tissues with which it comes in contact, and by virtue of this power it has been considered the chief factor in the absorption of roots. I believe, however, that the latter is due to another agency altogether, which will be considered presently. The nature of the discharge from an alveolar abscess varies in character from what is known as laudable “pus” to a thin sanious exudation. It has a strange phosphatic odour peculiar to itself, which cannot be accounted for, as far as I am aware, any more than the peculiar odour of sweat in acute rheumatism; like it, however, it has its own diagnostic value. There is one point in connection with alveolar suppuration which becomes important



clinically, and that is, that no pronounced inflammatory discharge from a periosteum can be detected, except the pulp in connection with it be completely broken down. A local suppurative periostitis, such as I have described, may be altered in character and develop into a serous cyst with a thin papery bony wall; and in several of these cases of maxillary cyst I have been enabled to distinctly trace the history of alveolar abscess.

#### CHANGES IN CEMENTUM.

The phenomena of absorption and addition to the surface of cementum are present in a marked degree in connection with chronic alveolar abscess. The latter condition has been described as exostosis, hyperostosis, and hypertrophied cementum. The last term is incorrect, for hypertrophy only occurs in connection with the increased functional activity of a part; the two first are misleading. In lieu of something better, I would suggest the term "cementosis," which is more expressive of what actually takes place. Absorption and cementosis may go on separately, synchronously, or alternately in the same root; and it seems quite impossible to decide upon the exact factors which determine and govern the various processes. As a broad general rule, I think it may be stated that a slight degree of irritation may produce cementosis, whilst absorption will depend upon more active inflammatory action.

1. *Absorption*.—As already stated, absorption of a root may proceed in a most erratic fashion, and inasmuch as a deposit of cementum may be taking place at the same time in the same specimen, it becomes somewhat difficult to trace the process. It is an easy matter to examine an inflamed periosteum in a comparatively fresh condition, but, unless the corresponding surface of the tooth be also observed at the same time under the microscope, we are apt to imagine a local condition which may not possibly exist. The various diagrammatic drawings which we see scattered about in popular works are only too often testimonies to vivid imagination rather than to truthful observation. If we want to find out what really does take place in the pathological absorption of the root, a section must be cut of both root and membrane, so that their exact relationship may be observed. This entails prolonged manipulation, which cannot but be prejudicial to the soft tissues; hence the difficulty by which we are handicapped. Nevertheless, a good deal may be grasped, and the details supplied may be supple-

mented by fair inference. There is one fact that obtrudes itself upon anyone who has studied the microscopic appearances of absorption of teeth, and that is,—that pus has little or nothing to do with the immediate process. The surface of the hard tissue presents innumerable absorption facets, forming on section segments of irregular circles, and in favourable specimens the individual facets are seen to contain large protoplasmic masses with a great number of nucleoli; these giant cells are backed up by cells similar in character but smaller in size, whilst beyond they imperceptibly graduate into ordinary leucocytes, supported by a fibrous stroma; and the direction of the fibres is worthy of note, as being in the direction of the absorption cells, and often at right angles to the fibrous tissue surrounding the root. That these cells are recruited from the leucocytes there can be no doubt, but what the nature of their solvent action is, remains at present a riddle.

2. *Cementosis* is the result of a low inflammation, as instanced in the case of teeth which cannot be detected as unhealthy in the mouth, whilst absorption is undoubtedly the result of a higher inflammatory action. The processes are, therefore, dependent upon local nutritive conditions of the alveolo-dental membrane, and variations of these conditions must account for the variation of the processes. The varieties of cementum deposited may be grouped into four divisions:—(1) Granular, (2) Laminar, (3) Lacunar, (4) Irregular. All of these varieties may be found in cementosis as the result of chronic thickening of the periosteum in a single specimen. In the normal cementum covering ordinary teeth, where the tissue is thin, it will be found faintly granular and almost structureless, whilst in positions where it is thick we have lacunæ and canaliculi pretty regularly distributed. The cementum found in conical molars where the fangs are glued together will generally be found to be of the granular variety. The laminar variety stains deeply, and looks as if wavy fibres running parallel with the surface of the root had become calcified; it is common in cementum covering the roots of teeth which have been slightly inflamed—as in the case of teeth with healthy pulps. Lacunar cementum is not found in large quantities on roots which have been the subject of tolerable intense inflammation, but occurs in isolated patches, and the lacunæ and canaliculi are irregularly distributed. The irregular variety, on the contrary, does appear in these cases, and suggests the calcification of a jumbled mass. Both this variety and the granular have faint

linear markings. I am unable to find out what variety of circumstances regulates the type of tissue formed, or to discover how the cell-elements differ either in size or arrangement in producing the different varieties. It has been suggested that the genetic cells (osteoblasts) are in no way to be distinguished from absorption cells (osteoclasts), but I think they may be distinctly differentiated. In the first place, they are distinctly smaller than the giant absorption cells; and in the second place, they are supported by a tissue whose fibres generally run parallel with the surface of the root. Should, however, the fibres happen to deviate from this general direction, the linear marking will correspond with such deviation.

#### CHANGES IN THE ALVEOLUS.

The bone lying in immediate contact with an inflamed dental periosteum is liable to become absorbed, and a specialised tissue performs this process in a precisely similar manner to that which obtains in the absorption of cementum. The space thus gained is filled with granulation tissue, and the inflammation may eventually cut off the vascular supply of a portion of bone, which then becomes necrosed. The medullary tissue, with which the alveolus may become riddled, cannot be distinguished in any way from the continuous tissue surrounding an inflamed root.

#### CHANGES IN DENTINE.

There has been, and there still exists, a great conflict of opinion as to whether "vital action" occurs in dentine, and whether strictly pathological conditions may be observed in this tissue apart from any changes which can be accounted for by purely chemical action. The question has arrived at its acutest stage in discussing the phenomena of caries; but as caries and alveolar abscess have no intimate relation the one to the other, I intend giving the former a wide berth. It will at least be a slight novelty—if of less interest—to enquire if any changes occur in dentine as the result of periostitis; and if so, whether they may be considered as pathological. It has been commonly noted that the dentine of the roots of teeth in old people has a peculiar horny, translucent appearance, quite distinct from the ordinary characteristic opacity of ordinary teeth; and this is also true of the roots of teeth exposed to long periosteal mischief. If the latter be carefully examined in section, there appears to the naked eye a distinct outer belt of tissue more apparent than the rest of the

dentine, and less susceptible to staining. The microscopic appearances confirm the existence of this transparent belt, and one naturally seeks for an explanation. In trying to account for the "transparent zone" in connection with caries, several theories have been advanced to explain a condition which appears to be allied to that under consideration. The simplest way of explaining the increased transparency is to ascribe it to calcification of the dentinal fibrils, and this is the ground taken up by Dr. Magitot. Leber and Rottenstein take up the direct negative, and say that the transparency is due to decalcification. Professor Wedl seems inclined to deny the theory of calcification, and says he has succeeded in staining the tubes and their contents of the transparent teeth of old people with carmine. Other workers have experimented in this direction, but time will not permit of an analysis of their opinions. Mr. Charles Tomes, to whom we are indebted for so much research in the field of dental pathology, appears to disfavor the idea of vital action in dentine—at least, that is the impression conveyed by a careful perusal of his latest account of caries. I am afraid my own experiments are so slight as scarcely to justify the expression of an opinion, and yet I am unable to account for the transparent belt of dentine in fangs which have been involved in periosteal inflammation without assuming a process of a low inflammatory nature. In the first place, it has yet to be proved that the tissue is incapable of pathological changes *per se*; the fact that it is non-vascular is of itself not sufficient, and on *a priori* grounds we are justified in assuming that any tissue, if it be alive, is capable of exhibiting inflammatory action. From a large number of sections which I have made, there appears to be a distinct increase of medullary tissue in the shape of enlarged tubes and their contents, which is more marked as it recedes from the area of irritation in the direction of the pulp canal. And this is further explained by its liability to deep staining, a phenomenon which is a characteristic feature of inflammatory material. On the other hand, the transparent belt already referred to in immediate continuity with the cementum certainly gives evidence of calcification as a sequence of inflammatory action; it may be noted that the increased transparency of the tissue may be differentiated from the dentine nearer the pulp canal even after the tooth has been softened in acid for the purpose of section cutting. In fact, the process seems to be somewhat analogous to



sclerosis of bone, varying in degree rather than in type. It has been generally assumed, in the words of Mr. Charles Tomes, that the vitality of the dentine is sacrificed when the pulp is destroyed; and we have been in the habit of speaking of a pulpless tooth as a *dead tooth*. I cannot subscribe to this formula, because I believe that death of the dentine does not necessarily follow death of the pulp. I think I may assert, without fear of contradiction, that in the whole range of human pathology not one instance could be found of new living material being deposited on dead tissue. Yet this is true if death of the dentine follows death of the pulp, as the deposition of cementum to repair absorbed patches of dentine in pulpless teeth may be easily demonstrated. One of the specimens under the microscope clearly shows this, and is taken from one of the fangs of a lower molar which had been treated for alveolar abscess unsuccessfully for a long period. This last indication of vital action in dentine is one which appears to me to be convincing; and I would particularly invite those members of the Society who are sceptical of anything in the shape of a pathological condition of dentine—and they must be in a large majority—to discuss this particular point, and try and account for such a strange phenomenon.

J. MONTAIGN IDSBURY, Paris, contributed a short communication on the Treatment of Inveterate Neuralgia of the Fifth Nerve.

#### DISCUSSION.

Mr. NEWLAND PEDLEY said: Mr. Lloyd Williams rightly said that the imbibition of septic degeneration pulp tissue was a rife cause of the disorder. Pasteur and Lister thought that putrefactive changes were entirely dependent on the agency of germs; on the other hand Billroth and others were of opinion that the decomposition of animal tissue must occur as a chemical process, under certain conditions, and apart from the addition of new agents.

Panum had extracted a highly putrefactive substance from macerated putrid meat. Also, we have the example of ptyalin, pepsin and pancreatin, which were derived from cell activity, yet acted in a purely chemical way. The above facts support the theory that decomposition and putrefactive decomposition are not necessarily dependent on micro-organisms, and we are aware that germs may exist in the discharge and tissues of a wound without its becoming putrid.

The next point was that the mere presence of putrid discharge need not occasion inflammation, for wounds with putrid discharge often heal well. Dead teeth, with open pulp cavities and pervious canals may long remain quiescent; and in the operation of rhizodontropy we often permit the putrified contents of a pulp chamber to drain through a wound in the periosteum, without harmful result. When, however, tissue in pent-up cavities is in the act of dying, a highly poisonous compound is formed. This is what takes place in teeth apparently sound, but with dead pulps. When these pulp chambers are opened some of them are putrid, and if we exclude the possible permeability of tooth substance by fluid from the surface, and in the absence of a sinus connected with the root of a tooth, we must infer that putrefaction can take place without germs, or that germs can obtain access to the pulp chamber from within. There is much to support the view that germs do permeate the tissues of the body. Putrid pus has been evacuated from deep seated cavities that never communicated with the surface. In animals, if injury be done to the medulla of a bone, and the animal fed on putrid food, septic osteo-myelitis results, probably from the absorption of a poison in germ form through the bowel. Similarly the belief seems to be daily gaining ground that the virus of many contagious diseases exists in the form of a micro-organism, and enters the system through the lung.

The President had pointed out that no germs had hitherto been found in the pulps of teeth that had decomposed in teeth apparently sound, yet he had admitted that they might have passed undetected.

If we admit the above facts, we shall be led to the conclusion that under certain circumstances germs may permeate the tissues of the body, and thus find access to the pulp chambers of the teeth. In our treatment of such teeth our object must be to remove as far as possible all germ pabulum from the root canals, and to thoroughly impregnate any remains of such tissue with strong disinfectants or germicides.

The PRESIDENT said there was little satisfactory evidence to explain the pathological changes which take place about the apex of the root during the inception of alveolar abscess, and he had no doubt research work upon this point would bring to light many new facts. He was sure the Society must feel obliged to Mr. Lloyd Williams for his work in that direction, and he hoped that further

investigation on his part would be attended with fresh additions to our knowledge.

After some observations by Dr. CUNNINGHAM and the PRESIDENT, the meeting then adjourned.

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THE Annual General Meeting of the Society was held on the 9th ult., at 40, Leicester Square, Mr. C. S. TOMES, F.R.S., President, in the chair.

The following gentlemen were elected as office-bearers for the ensuing session, 1888-9.

PRESIDENT : Mr. Daniel Corbett (Dublin).

VICE-PRESIDENTS : (Resident), Messrs. S. J. Hutchinson, J. H. Mummery, and W. F. Forsyth ; (Non-resident), Richard Rogers (Cheltenham), G. C. McAdam, Hereford, and J. Cornelius Wheeler (Southsea).

TREASURER : Thomas Arnold Rogers, Esq.

LIBRARIAN : Felix Weiss, Esq.

CURATOR : W. C. Storer Bennett, Esq.

EDITOR OF TRANSACTIONS : Frederic Canton, Esq.

HONORARY SECRETARIES : Messrs. Willoughby Weiss (*Council*), C. J. Boyd Wallis (*Society*), and E. G. Betts (*Foreign Correspondence*).

COUNCILLORS : (*Resident*), Messrs. J. F. Corbett, J. Smith-Turner, Sir Edwin Saunders, John Fairbank, David Hepburn, Ashley W. Barrett, Walter Coffin, Thomas Gaddes, R. H. Woodhouse ; (*Non-resident*), F. H. Balkwill (Plymouth), George Brunton (Leeds), E. Appleby (Stroud), J. H. Redmond (Brighton), W. Bowman Macleod (Edinburgh), and R. Wentworth White (Norwich).

The PRESIDENT stated that an influential memorial had been signed and handed in to the Council in favour of the election of Professor Miller, of Berlin, as a corresponding member. The name of Dr. Miller was familiar to them all as one who had continuously laboured for many years in the investigation of dental caries and cognate subjects of dental science. Dr. Miller's name would be put to the next meeting.

Mr. H. J. Barrett, formerly President of the society, was elected an hon. member by acclamation.

Mr. Arthur Underwood read a paper on "Erosion in connection with some points in the Minute Anatomy of Enamel." It was

granted by all authorities that that form of destruction of the dental tissues known as erosion had more or less baffled the attempts of pathologists to explain its phenomena. The etiology of erosion was still most obscure, and it was the duty of all who could throw any light upon it to submit it to the profession. It was with that view, and not any ambitious designs of framing a new theory, that he had for the last four or five years been examining and studying a typical case. The eroded surfaces did not appear to the naked eye to be specially exposed to the wear and tear of mastication, and were in places almost inaccessible to tooth brushes. Caries existed, and had attacked eroded surfaces. The erosion presented a characteristic, smooth, hard surface, and was slightly tinted with yellow pigment. The lesions looked as if they had been caused by filing. The enamel was always more affected than the dentine. Sometimes the whole surface seemed to have been sliced off, and in one case three of the four surfaces, together with the crown, were thus removed, leaving a square pillar of dentine standing. In the incisors the labial surface was grooved, in the upper the grooves being smaller, but more numerous than in the lower. The lingual surfaces of these last, and the whole of the molars, were free from erosion, and the constancy of this immunity led Mr. Underwood to believe that a perversion of sub-maxillary or parotid saliva cannot be held responsible for the pathological change. Dr. Black had discovered that the surfaces of teeth exposed to a continuous current of hydrochloric acid (1 in 1,000) become changed as if eroded. Further, Dr. Murie described the teeth of a sea-lion, the most exposed surfaces of which were very much eroded.

Summing up the question of situation of the erosion, Mr. Underwood found—(1) Surfaces not exposed to salivary secretions are not specially eroded; (2) the necks of teeth and the portion in contact with the gum were not specially selected; nor (3) were surfaces exposed to wear and tear; (4) while parts out of the way of mastication were commonly eroded; (5) Bland Sutton found among the lower animals that erosion attacks abortive and imperfectly formed teeth; (6) nooks and crannies wherein food accumulated and where caries was common were usually free from erosion; (7) the seats of erosion were generally freely washed by saliva not exposed by lodgment of food, inaccessible to tooth brushes, and not used for the fixing of bands.

In three marked cases a gouty form of rheumatism existed and



the buccal mucous was exceedingly acid. In two cases the teeth were not eroded until middle life; in the third until the twenty-first year, then erosion suddenly appeared and progressed rapidly, following a severe attack of rheumatism. Tracing the effect of erosion upon the living tissues, it was found that the eroded surface was sometimes very hyperæsthetic, intolerant of acids, sometimes absolutely insensitive; the pulp may die before it is reached, or may become protected by secondary dentine, or sometimes it may be exposed while yet alive.

Reverting to sections of eroded teeth when examined under the microscope, Mr. Underwood contrasted normal appearances of enamel with those presented after erosion; he believed the fibres never to be in actual contact, a clear interspace intervening. This usually appeared unoccupied, save occasionally when a thin line, apparently composed of fine dots, might indistinctly be made out in it. The interspaces apparently did not branch. The enamel fibres were finely granular, being covered with minute black dots; the space between them was lighter, but still darker than the interspace.

In some tracts of enamel the fibres were striated, the striæ being produced by aggregations of the above-mentioned dark dots; they never coincided with any alteration in the fibre's thickness. In some conditions of enamel, especially in young enamel, the striated patches were coarser, due to the dots being larger and more widely separated, and in such instances lime salts were present in a proportion below what was normal.

In highly-magnified sections, the brown striæ of Retzius appeared to consist of coinciding points of very coarse granular material, similar to that of infant enamel, the interspaces being larger at these points and the edges of the fibre strongly defined. In sections of the enamel of teeth suffering from erosion, the above-named granular condition was present in an exaggerated degree: the dark dots in the affected patches appeared to have run together, destroying the identity of the fibres. The interspaces were larger, and especially in the lines of Retzius. The appearance noted was indicative, Mr. Underwood believed, of a condition which rendered the tissues amenable to the causes, whatever they might be, that determined erosion. A fact supporting that contention, was, that the changes detailed were not peculiar to the eroded surfaces; although confined to eroded teeth, they existed below the surface and were, Mr. Underwood thought, types of what had been a surface and had caused

obstruction. Bacteria was seen to affect erosion only in so much as they might determine the formation of acid. With regard to the etiology of erosion, Mr. Underwood was of opinion that there were special characteristic defects in the enamel of those teeth which became affected by erosion, and that such teeth under certain conditions became affected. These conditions were a too acid state of the buccal secretions, a free washing of the enamel by these, and the use of injurious tooth powder.

Upon the suggestion of the President, Mr. S. J. HUTCHINSON immediately followed with his "Note on Erosion." He had given his short paper that title, being unable up to that time fully to explain the appearances he was about to describe, and which he believed had not been noticed previously in connection with that subject.

Erosion might be defined as a wasting or denudation of the enamel and dentine; it was not to be explained by friction, attrition, caries, or the presence in the mouth of acid materials, *e.g.*, medicines, mucous secretions, or saliva. Erosion usually attacked the enamel first, commonly appearing as a circular facet upon the labial surface of a tooth. This facet might be capped. Mr. Hutchinson had observed that the eroded surface was covered by a curious film of discoloration so thin as to be observable only by the assistance of a strong lens, but perfectly unmistakable when once seen. Invariably present on patches of erosion, it was always absent from surrounding and healthy enamel. The material forming it could be scraped off with a blunt instrument. Examined under the microscope, the scrapings looked like very minute circular epithelial scales. Seen in contrast the film appeared black. Vigorous use of the tooth-brush failed to remove it; indeed, it appeared as if it were an excessively thin layer of disorganized enamel or dentine. The appearance had been detected in patients between twenty and eighty years of age, in males and females, in smokers and non-smokers in dyspeptics and those free from gastric disturbances, in the mouths of those who cared well for their teeth, and in those who did not. It was found in the pits and grinding surfaces of unopposed molars ground down by attrition. Teeth so affected usually occurred in the mouth of patients who were not subject to caries.

Some discussion upon the papers ensued, and, after the usual votes of thanks to the office-bearers of the past year, the Meeting adjourned.

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**BENNISON v. WRIGHT.**

THIS was an action brought on Thursday, January 12th, at the Portsmouth County Court, before his Honour, Judge P. M. Leonard, by Mr. G. Bennison, L.D.S., Victoria Road, Southsea, to recover the sum of £7 17s. 6d., professional attendance and artificial teeth supplied to the wife of the defendant, a costumier of King's Road, Southsea.

Mr. J. J. Rochett (Palmer and Rochett) appeared for the plaintiff.

The plaintiff deposed that in January, 1884, he was consulted by defendant's wife for the purpose of having some artificial teeth. He extracted some stumps, &c., and asked the patient to call again when the mouth was healed. This she failed to do, and at the Christmas following an account was sent for the extractions.

Subsequently the defendant's wife informed the plaintiff that she still wished to have the teeth, and that she would then settle for all together. She afterwards called, and the teeth were finally fitted in June, 1885. On the account being again sent in, the defendant wrote and asked for an extension of time, and spoke of the teeth being most comfortable. As they constantly broke their promises of paying, the plaintiff was at length induced to place the matter in the hands of his solicitor; and then, for the first time, the defendant stated that the teeth did not fit.

Defendant: Is it not a fact that in the extractions you injured my wife's jaw, so that you were not able to take the model?

Plaintiff: No, it is not true, and this is the first I have heard of any injury.

Judge (to defendant): What is your defence?

Defendant: That the teeth do not fit.

Mr. Rochett: We shall prove our case, your Honour.

Mr. Charles Foran, Elm Grove, Southsea, called, said: I have examined the teeth in question, and I find that they fit both the model and the mouth; further, they have been worn for some time, as they are covered with tartar.

Defendant here applied for an adjournment, to bring rebutting evidence; but his Honour refused, on the grounds that the case had already been adjourned once, and also that the defendant had really no defence.

Verdict for the plaintiff, with costs, and expenses for witness, to be paid by instalments of £2 monthly.

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## Editorial.

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### DENTAL APPOINTMENTS.

IT need hardly be re-asserted that the possession of the L. D. S. diploma is the only evidence of dental training and qualification. That has been maintained for years past by those best capable of judging. Yet we find public bodies frequently slow to realise a truth of that kind. The regulations of several of the Metropolitan hospitals require that the Dentist to such institutions shall possess a certain qualification, but the special L. D. S. diploma is entirely ignored. Whilst the dental licence should be a *sine qua non*, other credentials, if needs be, could be demanded, but only in the sense of additional qualification.

It is satisfactory to find that, with regard to appointments in the provinces, the recognition of the Licence in Dental Surgery is becoming more general. For instance, at the Annual Meeting of the Governors of Chester Infirmary, held on the 31st ult., it was decided to amend the rules so that the Dentist to the institution must possess the Licence in Dental Surgery of one of the several Corporations.

Furthermore, it too frequently happens that the Dentist to an infirmary or hospital does not have the same status and rights as his medical and surgical colleagues. But at Chester this anomalous state of affairs has also been rectified. For the future the Dental Surgeon to that Charity shall have a seat at the Board of Management. This is what should be; for the Dental Surgeon generally devotes, at all events he may have the opportunity to devote, as much time and labour to the work of the establishment as any of his *confrères*.

Already the British Dental Association has done good service in respect to the former question. With regard to the latter, they who hold dental appointments should see that their position is equal to that of their colleagues.

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THE whole of the matter for the February number of the DENTAL RECORD was in type, but an unfortunate fire at the printers destroyed it entirely, including the MS. of a very interesting chapter of "Another Professional Holiday." Dr. Cunningham has kindly undertaken to re-write that section in time for the March issue.

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## CORRESPONDENCE.

## THE FIRST TO USE TIN AND GOLD.

*To the Editor of THE DENTAL RECORD.*

SIR,—On page 44 of your issue for January, 1888, your correspondent objects to "another attempt to give to Dr. Abbot, of Berlin, the credit of having first made use of a combination of gold and tin foil." If your correspondent will kindly refer to the "Independent Practitioner" for 1884, page 403, or to the "Correspondenzblatt für Zahnärzte," 1884, page 274, or to Poulson's "Viertel-jährlicher Bericht," No. 6, he will find the following account:—"About — years ago a gentleman called upon Dr. Abbot of Berlin to have his teeth examined. In one of his teeth Dr. Abbot found a discolored filling having the appearance of amalgam, and remarked that it was the best amalgam filling he had ever seen, to which it was replied that the filling was not of amalgam, but of a mixture of tin and gold foils. Since that time Dr. Abbot used this material," &c., &c.

I omitted this story in the present instance, partly because I had repeated it on so many occasions that it seemed superfluous, and partly because I knew nothing whatever as to the previous history of the filling referred to above. Dr. Abbot never claimed for a moment to have originated the practice. As far as the mere question of priority in the use of the combination is concerned, if we would do full justice, we must go many years beyond Mr. Lomax, to Dr. Spooner, who, we are told (*Cosmos*, 1888, p. 37) made use of the combination 50 or 60 years ago. I was much surprised to find that the combination had been extensively used in certain districts of England by Mr. Lomax, Mr. Martin, and others. It is to be regretted that the methods employed by these gentlemen, and the results obtained by them, were not made known to the profession at large. The credit of having done this must remain, I think, with Dr. Abbot, or with those who learned directly from him. One part of the correspondence I particularly value, *i.e.*, the statement by your correspondent that he constantly saw *very old and perfect* fillings made of the combination of tin and gold.

Berlin.

Yours, &c., W. D. MILLER.

## GOSSIP.

THE annual meeting of the Sheffield Association of Licentiates in Dental Surgery was held at 289, Glossop Road, on Tuesday, January 10th, 1888. An address was delivered by the President, J. Harrison, Esq. The following officers were elected for the year:—*President*—Joseph Harrison, L.D.S.I.; *Vice-Presidents*—(1) Frank Harrison, M.R.C.S., L.D.S., Edin.; (2) R. C. H. Drabble, L.D.S.; *Treasurer*—Charles Stokes, L.D.S.I.; *Hon. Secretary*—W. B. Tolputt, L.D.S., Glasg. The meetings for the past year have been nine in number. Many cases of interest have been shown, and the following papers have been read:—1887, May 9th, Dental Hygiene, by Mr. F. Harrison, M.R.C.S., L.D.S., Edin.; June 14th, On the preparation of the mouth for the insertion of Artificial Dentures, by Mr. R. C. H. Drabble, L.D.S.I.; October 11th, Caries among the Caffres, by Mr. J. W. Griffith, L.D.S.I.; Nov. 8th, Hæmorrhagic Diathesis, by Mr. W. B. Tolputt, L.D.S., Glasg.

A NUMBER of the students at present attending the Edinburgh Dental Hospital have inaugurated a series of "socials," intended to be held once a month during the session. The meetings are held on Saturday evenings, the chairman and croupier being elected by their fellow students. At the inaugural social Mr. A. E. Donegan, B.A., Cambridge, one of the senior students, and instigator of the movement, occupied the chair. The students spent a most pleasant evening together, and in every respect the event may be considered highly successful.

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**ON THE COMBINATION OF TIN AND GOLD AS A FILLING  
MATERIAL FOR THE TEETH.**

By W. D. MILLER, M.D., Ph.D., &c.,

Professor in the Dental Institute of the University of Berlin.

*(Being a series of Lectures delivered in the Institute, and translated from the  
German by Miss St. George Elliott.)*

*(Continued from page 57.)*

So much for the capping with pure gold of fillings of tin and gold upon the masticating surface of molars.

In extensive caries on the approximal surface of the front teeth, particularly when the latter are weak and yet a gold filling is thought advisable, I always first cover the cervical as well as the palatal wall with tin and gold, and hereby attain a better result in a considerably shorter time than if I were to fill the entire cavity with gold alone.

The combination of tin and gold with pure gold is of great importance in the stopping of carious incisors, which are already sensitive to changes of temperature. Here the practice of filling from the lingual portions over the adjoining pulp with tin and gold and completing the stopping from the front (labial) part with cohesive gold, is highly recommended.

The employment of tin and gold, in all cases where one wishes to stop with gold, and the approximal cavity extends under the borders of the gums, is of the utmost value. You all know how difficult and painful it is to keep such cavities dry by means of the rubber dam, and also in how short a time the best fillings of cohesive gold fail in this position. In order to avoid this trying and insecure operation, gutta-percha, pure tin foil and also amalgam have been proposed for filling that portion of the cavity lying in the vicinity

of the gums. It is also well known that not one of these methods comes up to the required standard; here it is, however, that tin and gold does excellent service, and is everywhere recommended as being unsurpassed.

Particularly in large cavities on the mesial surfaces of bicusps, in which the sight of a dark filling of tin and gold would not afford the patient much pleasure, I always begin with this material and fill the cavity with it about one-third or two-thirds full, according to circumstances. This procedure serves a double purpose, first, of



Fig. 14.

of diminishing the time to about one-third or a-half of that usually necessary for a gold filling, as well as of perceptibly lightening the operation. A section of this filling has the appearance given in Fig. 14. It is only by a thorough examination that one can distinguish between such a stopping in the mouth and one composed entirely of gold.

In this case one must not depend upon adhesion, which will arise between the pure metal and the tin and gold part for the retention of the former, but the gold must have a hold on the side of the cavity, otherwise the gold cap might be bitten off before union had taken place between the two parts of the filling. The necessary retaining points for the gold are obtained by undercutting the sides of the cavity, and in the tin and gold itself.

In performing this operation, and before commencing with the gold cap, I always condense the tin and gold well with the mallet, in order to obtain a sufficiently hard substratum. Dr. Sachs, of Breslau, in such cases sometimes presses the first layers of tin and gold, by means of the rotation method, rather hard against the cervical surfaces. By this process the soft material, he thinks, is pressed well and uniformly into all inequalities in the cavity, without the danger of breaking off little splinters of the enamel. He lays a matrix somewhat loosely between the teeth, so that after the cavity has been stopped, some of the tin and gold will project above the walls. If one were to press the matrix very firmly against the tooth by means of wedges, it might so happen that after the condensation of the material the walls would not be completely filled.

I have described this method of filling approximal cavities, because the insertion of solid contour filling is in point of fact one of the

most difficult, and too often one of the most discouraging, operations a dentist has to perform. A secure mode of fastening the gold cap is, according to my observations, a cavity or retaining point in the masticating surface, which opens towards the side of the cavity to be filled. If you fill gold from the starting point (Fig. 14), in the direction of arrow "b," as a cap for the tin and gold which has already been firmly condensed in the bare cavity, you will produce such a stopping as will be highly satisfactory. The question whether the gold plug will eventually become loosened must be answered in the negative; it frequently unites so firmly with the tin and gold that it is almost impossible to separate them. Of the hundreds of fillings of this character that I have inserted, I am not aware of a single case where the gold cap separated from the underlying tin and gold.

It is also much easier to finish a filling of this kind than one of pure gold. After the material has been condensed, I often use a sharp lancet-shaped knife to remove the surplus from the neck of the tooth, always cutting towards the margin if possible. In this way the operation takes but an exceedingly short time, and the difference in facility produced by this method of combination is sometimes marvellous. Every one knows the great difficulty experienced in properly securing a gold filling in extended approximal caries, especially in the earlier part of the operation, and also in the final finishing of such a filling at the neck of the tooth. All these difficulties, however, are in a great measure avoided by the building up of the cervical part of the cavity with tin and gold, and the all too frequent recurrence of secondary caries on the cervical wall, even in the best gold fillings, is by these means reduced to a minimum.

In order, if possible, to give you a still clearer understanding of the process of putting in fillings of combined materials, I take this opportunity, at the close of the chapter, to describe a case from practice. This was an upper molar which—many years before the patient put himself under my care—after being separated from the bicuspid, had been filled at the same time as the latter by a qualified practitioner. The pulp of the bicuspid lay very near the cavity, and was consequently overcapped with tin-foil.

The possessor of the tooth, a colleague, naturally spared no pains to preserve the then faultless gold filling by constant cleansing. In spite of this, six years later there appeared on the gum over the



gold filling of the molar secondary caries, which was subsequently found to have penetrated under the gums, and to the immediate vicinity of the pulp. In order to push back the gums, after superficially removing the softened dentine from the cervical portion of the cavity, I stopped the latter securely with carbolized cotton, and the next day proceeded to fill the tooth, as follows.

As soon as I had positively ascertained that the pulp of the tooth, which was somewhat sensitive to changes of temperature, was still covered by a thin layer of dentine, and also that it was in a healthy condition, I placed a napkin around the tooth, dried the cavity, and removed the crumbling walls of enamel on the masticating surface, in order to obtain a hard margin. I made only a shallow undercut in the cervical wall of the cavity, but made it deeper on the side walls, particularly towards the masticating surface, where I wished to form retaining points for the gold cap. The wall, which was formed by the masticating surface, I undermined but little, for fear of weakening the enamel. After the cavity was excavated and sterilized, I laid three or four medium (10-12 mill.) long pellets of tin and gold, and pressed them firmly towards the cervico-palatal wall with hand pressure and mallet. Beginning at this wall I continued to build up until the entire cervical wall and the best part of the palatal was covered, the buccal wall, on the contrary, being for the most part free. I then filled the angle formed by the buccal wall and that of tin and gold already in place with three or four large pellets of the latter material, and condensed the whole with a mallet. The cavity was then about two-thirds full of tin and gold. I began to fill from the spot already selected for a side retaining point in the corner of the masticating surface, until I gradually formed a partial cap for the tin and gold of pellets of cohesive gold, which were quickly put in position and easily finished. It took just thirteen minutes to make this stopping, and no rubber-dam was used. When caries has destroyed a large portion of the masticating surface, it is even easier to build a gold cap than in the operation just described, on account of the facility with which one can find good retaining points, even in the masticating surface itself.

The final finishing of the stopping above referred to took comparatively long, as the contoured gold cap rendered it somewhat difficult to reach the tin and gold. For this reason, I occasionally entirely complete the tin and gold portion of such fillings before

commencing on the cap of gold. In the case spoken of I pressed the projecting tin and gold first with a long foot plugger, then with instrument No. 8 as far as possible into the cavity, separated with a thin saw, removed the overhanging material on the neck of the tooth with a lancet and polished it with strips of sandpaper. The entire operation lasted about 33 minutes, while six years previous to this the operation of filling the same cavity, then much simpler, with gold, lasted  $1\frac{1}{2}$  hours.

#### EXPERIMENTS WITH THE COMBINATION OF TIN AND GOLD.

I have now arrived at the end of my lecture, but still have a few experiments to which I wish to call your attention, thinking that they may help to explain some of the peculiar changes this material undergoes in the human mouth.

It has already been stated that in old fillings of tin and gold neither the tin nor the gold is distinguishable. The whole forms a hard, stone-like mass, which is sometimes in cutting apt to be confounded with amalgam. It is of interest to find out the cause of this condition and to know what changes each material has been subject to.

It is customary to talk of the discoloration of tin and gold as if it were due to an oxidation of the tin, but it ought to strike everyone that this explanation is incorrect, as the oxyd of tin is not black but white. The following experiments will help to elucidate this. Put a leaf of gold-foil between two leaves of tin-foil and place all in a solution of lactic acid of 1 per cent. If the material is kept at blood heat you will scarcely be able at the end of a few hours to distinguish the gold from the tin. The gold is no longer yellow but grey, like the tin. Several hours later the gold will assume a brownish tint, gradually passing into bronze or black. A white flaky deposit, consisting of the oxyd of tin, becomes visible in the solution; the grey-black layer resting upon the gold is composed of metallic tin; in the solution proper much tin is found, but no gold of any consequence.

These appearances occur very readily in a solution of lactic acid, and this acid is, as I have already stated in a former lecture, produced by fermentation in the mouth; in acetic acid they do not appear so quickly, while in butyric acid they are not to be found at all. This is also the case in nitric acid, but they are recognisable in muriatic acid and in solutions of sulphuric acid. If the experiment is tried

under pressure, the two metals unite so thoroughly that it is sometimes difficult to separate them. If a leaf of gold-foil is simply placed upon one of tin-foil, the under part only of the gold becomes discoloured, but if upon the gold leaf a glass plate is placed the upper side of the gold will also change colour, but not so rapidly as the under part. In my opinion, this phenomenon is explained in the following manner. In the solution of lactic acid an electrical current is generated between the tin and the gold; hydrogen collects upon the surface of the gold and oxygen upon that of the tin. The oxygen unites with the tin and forms oxyd of tin; this electro-positive oxyd of tin moves towards the electro-negative gold, and is by means of the hydrogen deprived of its oxygen and is precipitated as metallic tin upon the surface of the gold.

The fact that the upper side of the gold-leaf does not change colour when free, but does when covered with an indifferent plate (glass), I can explain only by supposing that in the first case the hydrogen disappears as soon as it is generated, and, therefore, no reduction of oxyd of tin takes place. In the second case, however, it is held fast on the surface of the gold by the glass plate, and gives rise to the reduction of the oxyd of tin. A very similar result may be obtained by uniting a piece of tin-foil and one of gold-foil by means of a conductor (copper wire) and suspending them in a weak solution of lactic acid—of course, not allowing the wire to come in contact with the acid. In a few days the gold, where it is folded together, will have a grey or bronze colour, while the free outer surface will not have perceptibly changed in colour. The gold appears not to suffer any change during the process, and although in old fillings, even when subjected to a microscopic test, there is no trace of gold to be seen; its existence can be proved by a lengthened action of nitric acid of specific gravity about 1, 3.\*

I have already stated that fillings of tin and gold seemed to become hardened more rapidly when I placed the material, still

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\* I do not wish it to be understood that I give the above as a conclusive and definite explanation of the process which takes place in tin-gold fillings. It is the only explanation which I am able to give at present; the future may reveal a more satisfactory one. It is, however, endorsed by chemists of authority in Berlin, with whom I have conversed on the subject. I doubt very much if the hardening of the filling can take place under absolute exclusion of moisture, as some affirm. I recently examined eleven tin-gold fillings made out of the mouth some ten years ago; I either detected no change at all or one which was limited to an indefinitely thin surface layer.

damp, in the cavity than when it was put in dry, and this gave rise to the idea that by moistening the tin and gold with certain substances, the chemico-electrical changes, and the resulting hardening of the material, might be more readily achieved. Ad. Witzel was the first to make experiments in this direction, and he began with a solution of carbolized chloride of zinc, in which he dipped the first pellets of tin and gold. As in this way the whole material, by means of the solution of salt pressed from the first pellets, became saturated, he attained a more rapid hardening of the tin and gold. I myself have experimentally tested these practical observations, and have found that while carbolic acid has not much power to hasten the hardening process, chloride of zinc has, on the contrary, a marked effect.

As regards the expansion of the material after stopping, it has been ascertained that those fillings which have been polished off quite even with the gum have, after a lapse of months, very slightly protruded over the level of the same. Of six little glass tubes (5.0 mm. in diameter and 0.6 mm. thick), which I filled with tin and gold and allowed to remain for three weeks in a mixture of bread and saliva, one was cracked, but the others were quite intact at the end of six weeks.

Gentlemen, if you have followed my lecture thus far, and will now endeavour to recall all the points which I have brought to your notice in favour of this combination of tin and gold, you will, I am sure, join with me in saying that no filling material possesses so many good and noteworthy qualities as does this tin and gold, and you will agree with me in emphasising the advantage it has over others in not requiring absolute dryness in its introduction.

Again, the ease with which it may be introduced, its softness and ready adaptability, the rapidity with which it may be manipulated, the possibility of thoroughly if not permanently sterilizing the cavity in which it is placed by saturating the material with strong antiseptics, the hardening and probable slight expansion which it undergoes after insertion; these qualities are certainly sufficient to merit for it a thorough trial by every practitioner. Therefore, I hope I may not be considered too enthusiastic in expressing a wish that soon this material may be used by all dentists. Already it has made great strides into general favour, and is to-day largely employed by a great number of the most competent operators in Germany and America. In the Dental Institute of the University in this city, we prefer this material to cement or amalgam in large cavities, and as far



as we have been able to discover, the results have been better. But, as is the case with every operation, "practice makes perfect," and the filling of teeth with tin and gold requires experience. If you have been in the habit of stopping with non-cohesive gold, it will not take you long to accustom yourselves to tin-gold. Allow me to entreat beginners to commence by filling central cavities on the masticating surface of molars, and only after thorough practice in handling the material to attempt stoppings in side cavities. The placing of a covering of gold upon a filling of tin and gold requires naturally proficiency in stopping with gold. The best recommendation for the use of tin and gold seems to me to be the fact that everyone who handles it for a short time speedily employs it largely in his practice. A well-known London colleague, Dr. W. St. George Elliott, to whom I described this material in 1882, told me the year following that he used it in one-third of all cavities in bicusps and molars. Dr. Ad. Witzel, to whom I first demonstrated the process of filling with tin-gold a few months ago, tells me that he cannot do without tin and gold, now that he is well acquainted with its nature and the admirable qualities it possesses.

It is undoubtedly not so easy to learn how to stop teeth with tin and gold as it is with amalgam or cement ; but I myself, as a teacher, consider it indispensable for the student thoroughly to learn the handling of foil for stopping teeth, as well as the placing of the same in cavities with a hand-plugger, and I strongly advise him to practise this method diligently. The system of stopping by hand-pressure forms the scientific basis of filling. It alone gives the hand of the operator the fine sense of feeling and the security which is essential to a conservative treatment of caries ; it obliges the student, however, always to form the cavities after certain uniform and clearly-defined and regulated principles, and to place the filling-material with careful precision in the cavity prepared for it. He who is scientifically grounded in the methods of filling teeth with noncohesive gold will have no difficulty in filling with tin and gold, while he who has enjoyed only the one-sided "hard gold" dental education imparted in some of our schools, will find no material with which he can more speedily acquire the requisite manipulative ability than with the combination here recommended.\*

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\* A number of the illustrations accompanying this lecture were drawn at my request by Dr. Ad Witzel-Essen, for which I wish to express my sincere thanks to my esteemed colleague.

## THERAPEUTIC AND ELECTRO-THERAPEUTIC ACTION OF TIN-GOLD.

Regarding the therapeutic action of fillings of tin-gold upon living dentine, statements appear from time to time in the dental journals which are not well grounded. I have repeatedly observed that the dentine under such fillings had become harder than at the time of inserting the fillings; the same effect, however, may be observed under a perfectly water-tight filling of any material. The secret of this action is, in my opinion, to be sought for in the perfect exclusion of moisture, and I have never yet heard of a sufficient reason, or in fact any reason at all, for attributing to this inert material a direct action upon the dentine of the tooth. In the *Independent Practitioner* for 1884, page 286, I published the results of a series of experiments, made with a view to determining the antiseptic powers of various filling materials, from which it may be seen that the combination of tin and gold offers little or no hindrance to the development of bacteria.

Concerning what we may call the supposed electro-antiseptic action of tin-gold fillings, and of combined fillings in general, a statement was made not long ago, in a prominent dental society, which should be corrected. Speaking in particular of cavities filled at the cervical wall with amalgam and completed with gold, the speaker gives us to understand that the cervical border is protected by and enveloped in an electric current, and this current renders a certain defined territory or space about such margins thoroughly aseptic. The speaker was furthermore pretty well convinced that if a pulp should die under these circumstances, no putrefaction would occur, the same being prevented by the electric current constantly flowing through the root-canal. In accordance with these ideas, it was suggested that the bacteria should be given "more lightening." The experiments of Cohn, Mendelssohn, and many others, have taught us how little we are to expect from the application of electricity in infectious diseases, even when currents are made use of which are at least 100,000 to 1,000,000 times as strong as any which passes through a dead pulp in a tooth filled with amalgam and gold, or tin and gold, or any other two filling materials. Electric currents from combined fillings do not have even the shadow of a retarding influence upon fermentative or putrefactive processes in the human mouth. Any one may easily satisfy himself of the truth of this statement by a few simple experiments.

(To be continued.)

## TREATMENT OF PAIN.

*(A paper read before the Students' Society of the National Dental College.)*

By JAMES MAUGHAN, M.D., L.R.C.P., M.R.C.S.

MR. PRESIDENT AND GENTLEMEN,—The subject I have chosen for discussion is one that will commend itself at once to the humanitarian and the scientific instincts of all here to-night. In putting my thoughts together, I shall adhere as nearly as I can to the dental aspect of the question, and so invite your kindly criticism.

The treatment of pain must be premised by a word or two as to its pathology. What has baffled the sorcerers and philosophers of old still baffles the neurologists of to-day, and they are unable to state clearly in so many words, or to demonstrate practically to sufferers or non-sufferers, the true pathology of pain. That there is an invisible and subtle something passing along sensory nerves, and that the consciousness must be in unbroken connection with such nerves are hypotheses that all must admit. And, moreover, whatever the impalpable something may be in its essence, we can go one step further, and assert that it is *always* associated with degenerative changes and lowered vitality in the nerve itself. If we cannot formulate in exact terms the real nature of pain, we are equally wanting in an instrument by which we can perceive its presence and measure its intensity.

Gentlemen, an immortal name awaits the one among you who will invent an aesthesiometer and give to the world a means of detecting instantly the tricks of a malingerer, or of diagnosing a case of hysteria rapidly and easily. In bygone days a man was bled because he was living at too fast a rate; his chest was cupped for a disease exhausting enough in itself. Aconite and antimony, both powerful depressants, to say nothing of mercury with its hydra-headed sequelæ, were then pretty active in the market. The touch-stone of the pathology of the day was that organs at times took on an over-action or excess of function, and the recognised and orthodox treatment was to check such excess.

Mark the logic and pathology in a given case: a young woman pale and whose features are blunted by an anæmic dropsy, came to me this morning complaining of her heart beating. According to our forefathers, the heart acting too quickly requires some sedative to slow its pulsations. Such a line of treatment would be a fatal failure. The blood is very scantily furnished with red corpuscles, every

organ in the body is supplied with insufficient nutriment; the heart does its duty in pumping the blood to the medulla oblongata, but the blood it pumps is so poor that the centre for the vagus nerve acts but feebly; the heart thus loses the advantage of its controlling action, and, in short, gallops away under the cruel spur of the sympathetic. The right treatment, undoubtedly, is to improve the blood with the perchloride of iron and general tonic treatment. We must learn to regard these alleged over-actions, then, with a sceptic's eye, and seek for the real cause of suffering in something beyond.

This cause is invariably present; it is our duty to discover it and our prerogative to remove it. Toothache, then, is not an over-acting dental nerve, it is not a spontaneous hyperæsthesia suddenly and facetiously developed; it is the evidence that some definite irritation exists either in the neighbourhood or in some remote spot. You will readily understand that for one and the same lesion the degree of pain varies according to the individual sensitiveness of the cortex of the brain or the tone and vigour of the nerve affected. And again, the neuralgia of a big nerve is far more severe than that of a small one. You may remember the dogma of Romberg that pain in a nerve is its prayer for purer blood. But nerves are not so intellectual; they are more like babies, they cry out when they are hurt. Now it requires some pains and patience to find out where they are hurt, but as surely as the cause is sought for with a clear head and an impartial eye, so surely will it be discovered. If we make up our minds to discountenance the strictly symptomatic form of treatment as opposed to the thoughtful and rational, we will make fewer mistakes and better men. It is no easy task to face the thousand and one variations and mimicries the nervous system plays to us, and to be able to read the riddles aright. Still, if we do our clinical work carefully and conscientiously, we will discover the best treatment, though it may be in an empirical way.

The situation of pain you usually meet with is where the sensory filaments of the fifth cranial nerve are distributed. Now, this nerve, as you know, has three branches; that is to say, the ophthalmic, the superior maxillary, and the inferior maxillary.

Ophthalmic neuralgia is far and away the most common, and expresses itself most acutely in five foci, that at the supraorbital foramen being the most frequently affected. But pain occurring in one supraorbital area, at periodic intervals between the attacks, is usually due to malaria, and a pain felt by the supraorbital nerve on



the vertex of the head, as if a nail or spike were being driven in, is a peculiarly hysterical symptom. Syphilis, gout, and rheumatism have a great partiality for fibrous structures, and for causing a thickening thereof. Now, such a thickening just at the opening of a bony canal, whence a nerve emerges, may press very prejudicially upon that nerve, impede its nutrition, and cause severe neuralgia. Imagine such a state of things at the supraorbital foramen.

I mention these incidents and cases that you may be on the alert not to come to a conclusion too rashly, and condemn a tooth to a summary execution without due deliberation. For sometimes your patient may be the very tempter himself to lead you astray from the path I would have you walk in. Take a case in point. A man comes to you complaining of a certain tooth, and details the agonies and sleepless nights it has caused him. You listen attentively, nay, sympathetically. On examining the tooth he indicates, you find it to be perfectly sound. What is your bounden duty? Just examine the teeth in the neighbourhood, and then you may find a tooth or its periosteum gone wrong. Questioning your patient further, you learn that the pain was originally in the diseased tooth, but it went from that to the healthy one. The explanation we need not go far to find. The current of irritation travels from the carious tooth along the dental nerve to its ganglionic cell, and this under the painful excitement becomes flushed and hyperæmic. Now this excessive hyperæmia extends and overflows into the adjacent grey cell which happens to belong to the healthy tooth. The result is, that the urgent pain in the carious tooth is relieved, and the healthy one aches because its centre is hyperæmic. Beware, then, of extracting that sound tooth. If, after an operation, you find the tooth in an incurable state, your satisfaction must be complete. If, on the other hand, the tooth is a healthy one, and its extraction unnecessary, what qualms your conscience must suffer. Your success in life depends on your reputation, and your reputation on your professional skill. Convince yourselves first, as far as possible, that a tooth is in an irremediable condition ere you extract it; and I say this, if the neuralgia be severe, and the tooth appears to be the cause. A very small amount of caries may, in a neurotic patient, give rise to extreme pain, but a soothing dressing and a suitable stopping, accompanied by some quinine or arsenic internally, cures your case. These drugs are tonics to the nerves and to the blood, and they promote the nutri-

tion of the body, hence their marvellous effects in some cases of neuralgia. I hope I am not irrelevant in saying that the Styrians use arsenic to improve their horses' coats. Teeth are epidermal tissues as well as horses' coats.

Phosphorus is essentially a fat forming medicine. Now you will remember that the middle coat of a nerve—the white substance of Schwann—is almost entirely composed of a fatty menstrum. Therefore phosphorus, and among the rest milk, cream, butter and bacon, are of eminent service in the neuralgia of wasting nerves. For an exhausting neuralgia of some weeks' duration, a dose of gr. xx of bromide of potassium with gr. x of chloral every two hours, is very effective. But these sedatives should never be a substitute for the dental surgeon; and, moreover, they ought always to be followed up by some nerve tonic, such as cod liver oil.

Croton chloral has been in use now for more than fifteen years, and there are cases of tic that are best treated by this remedy. It exercises a selective action on the 5th nerve and affords relief without any unpleasant after effects. But in the true epileptiform neuralgia of Trousseau the best treatment undoubtedly is to administer that "sweet oblivious antidote," chloroform, and then inject morphia hypodermically. This variety of pain is not associated with dental lesions as a rule; therefore it would be an unhappy course to extract teeth for the cure thereof. This treatment of chloroform inhalation, followed by a hypodermic injection of morphia afterwards, is, singularly enough, the orthodox treatment for spasms of internal muscles, and for delirium of some kinds. So that a very pretty algebraical picture is thrust upon our minds, full of interest, truth and suggestiveness. It is this—

Neuralgia : a nerve : : Spasm : a muscle  
: : Delirium : the mind

and we can go further and say—

Numbness : a nerve : : Paralysis : a muscle  
: : Coma : the mind

In a case of sick headache, technically known as migraine, the storm is sometimes preceded by neuralgia of one auriculo-temporal nerve. If aconite be applied externally over the painful area, and extract of Indian hemp administered internally in 1-gr. doses every 2 or 3 hours, relief will come safely and quickly. But disabuse your minds of the hope of curing a case of migraine by simply extracting a tooth. It is a possible but a very unlikely result. Iron is an

exceedingly valuable medicine when the patient's gums are pale, whatever the lesions in the teeth may be. If the neuralgia be due to inflammation, no medicine is better than antimonial wine in xv. m. doses every hour.

If there be periostitis, a brisk counter-irritant should be applied to the gum in the neighbourhood. A good liniment for this purpose is made by mixing equal parts of Fleming's tincture of aconite and a strong liniment of iodine (double the strength of the Pharmacopœia liniment). In all cases of neuralgia it is your paramount duty to examine the teeth very carefully and then decide on your treatment.

If we could take a leaf out of many past lives it would astonish us to know how many teeth have been extracted that might have been saved if a little more care and attention had been bestowed. For, after all, the practice of your profession is not summed up in the words "Operate as much as you can," but rather in doing your utmost to preserve the teeth of your patients, and save them from as much future discomfort as possible. And the value of a single tooth must not be forgotten. My paper would be sadly incomplete if I did not express my sentiments on the other side of the question I have been discussing from its conservative aspect. I must tell you I have a very high appreciation of your profession, and of the noble position you may reach by patient earnest work. The day will come with its golden opportunity (and may it come often!) when you will strike with your forceps well home round a sinful tooth, wrench it from its socket, and so save your patient from a lifelong misery, from epileptiform seizures, or from a state truly deplorable, yet none the less real—a state sans eyes, sans ears, sans taste, sans everything. Neither the dentist nor the doctor can afford to dispense with each other in this cosmopolitan problem—the treatment of pain. The dentist does his work admirably and precisely, but it requires a prescription from the doctor to restore the nerves to the normal state they were in before they contracted the evil habit of aching. The physician who treats a facial neuralgia without consulting a dental surgeon drags his patient, as a rule, into a slough of despond, and himself into professional disrepute. You have no doubt observed that I have omitted many remedies of undoubted efficacy in the treatment of pain, notably stretching and excision of a nerve, and the application of the electric current. I could not say all I would have wished to say, but if I have warned you against too hurried a diagnosis, if I have encouraged

you to forget crooked creeds and worn-out dogmas respecting the treatment of pain ; if, in short, I have led you into an atmosphere of more thoughtful and conscientious work, I shall be glad to know your sympathies are mine, and each of us can say with Matthew Arnold, in his "Obermann," that—

" . . . . rigorous teachers trained my youth,  
And purged its faith and cleansed its fire ;  
Showed me the high white star of truth,  
There bade me gaze and there aspire."

### UNHEALTHY BREATH.

By ALFRED H. TESTER, L.D.S.Eng., D.M.D.Harv.

*Read before the Brighton Dental Society, December 10th, 1887.*

THE subject which I have chosen to speak to you about this evening is not, I know, an inviting one. It is shunned by most dental writers, and articles treating of it in our journals are very rare.

The question naturally arises in our minds, What is the reason of this almost total neglect of this very important topic, which, if not absolutely belonging to our speciality, is one so intimately connected with it, that it should interest every member of our profession?

I cannot but think that the neglect is occasioned by want of knowledge of its primary causes, and a lack of general knowledge of the relations of all the organs (the one to the other) that work together for the sustenance and maintenance of the life and health of our bodies.

I am sure the existence of it is pretty patent. Does it not intrude on us everywhere—in the street, railway carriage, as well as our homes? Are we not annoyed at every turn—at the place of amusement, at the church and the lecture? I am sorry to say that we are obliged to turn away in disgust oftentimes when conversing with the intelligent, from the foul odour which comes from their breath. Are we not sorry within ourselves, and is not our pity greater than our disgust for those unfortunately so afflicted?

The love of purity and sweetness is inherent in our natures ; a sweet breath, then, becomes a fortune and a blessing. But, as a class, who does it annoy more than the dentist, who, hour after hour and day after day has to earn his living by bending over the "gateway of life," the breathing-places of human beings, taking into his central vitality the putrid odours which emanate from some of our



patients. But, alas! for the weakness of humanity. "They that live in glass houses should never throw stones," and we who criticise are not exempt from the plague, and I am sure we should look to ourselves before we preach to our patients.

Doubtless, the causes of unhealthy breath are numerous. Temporarily, it may be produced by any nauseous or ill-flavoured substance, either chewed or used as food, such as garlic, onions, tobacco, &c., or by bad odoured drinks; by simple apposition to the teeth and mouth of remnants of food getting foul; and by diseases of the teeth and gums, which could at all times be averted by regular habits of cleanliness and judicious treatment—for instance, by washing the mouth and brushing the teeth constantly, and especially the last thing at night, and having all cavities filled, unhealthy roots extracted, and diseases of the gums cured.

Other causes are found in those suffering from dyspepsia and constitutional derangements of the system.

There are also a great many persons afflicted with this unhealthy tendency, who have no idea of its cause through any act of their own, and are as innocent of the existing trouble as a newly-born babe.

We find that we must seek for the cause of the odour in emanations of the glands, placed along the mucous tract, from its commencement to its close, and, of course, more particularly those of the mouth, throat and nasal passages.

We may also seek for it in the air from the lungs, as an emanation from the blood itself.

There may be many other causes, but if we understand the philosophy of the cause of disease in these parts, we probably shall be able to understand it in other parts of the system.

On examining the condition of health, we find that the system may, in its relation to food, be divided into three separate functions:—First, the organs of *reception*, viz., the mouth, teeth, and glands, salivary and tonsilary, &c., preparatory to entering the second—the stomach—portion of the alimentary canal with pancreas, liver, and surrounding viscera, which may be termed the organs of *assimilation*; and third, the remainder of the intestinal tract, kidneys, &c., called the organs of *excretion*.

The functions of all these parts are strictly marked, and never, under the conditions of absolute health, does one organ interfere with the other, but in an overworked, or diseased condition of an organ some other one may assist it in its duties, as the skin, which

under ordinary conditions secretes a lubricating fluid for the protection of its surface and adjusting the heat of the body, may carry off through its pores the emanations that more properly belong to the kidneys, bladder, or intestines.

The "*interchange of function*," well known to physiologists, assists us to understand our subject, for, as a rule, all the impurities of the system should be removed by the organs of excretion when they are in a state of health.

Let any of these three organs be out of order, as for example, the motions of the rejecting canal be retarded, the accumulated secretion must find some other exit. Therefore, when there is any disagreeable odour present there must be some poisonous matter confined to cause it; matter that should be eliminated, and which is detrimental to health, and therefore the organs containing it are in a state of disease.

Weakness in the organs of assimilation causes an irritating of the surface of the stomach, which brings on an increase of activity of the blood vessels, and ends in the inflammation of the part.

An illustration of this, is the case of an overloaded stomach. Persons who are liable to chronic bad health will have it come on under such a condition; an hour or two after a meal a tainted breath is noticed, it increases rapidly and constantly, until the stomach appears to be entirely empty. In some cases even then it may continue and increase, but if fasting is continued long enough, the unhealthy taste in the mouth and tainted breath are overcome and purity returns.

If the organs below the stomach do their duty, there will be less chance of unhealthy breath, but if not so, foul gases will be evolved by imperfect digestion and the fermentation of more food than the stomach can wrestle with.

The proper balance of diet in its vegetable, animal, and mineral constituents will, as far as diet is concerned, produce health, but it is necessary that all the surplus that is not retainable should be thoroughly eliminated from the system; but to do this the excretory organs must be in active working condition; they should not be coaxed into working order by the aid of aperients.

If these organs are not capable of this duty, and cannot fulfil it completely, some portion of the debris must remain in the system, and as it is a poison, it cannot be stored in any one organ without causing danger of a fatal sickness.

Nature, by the same mode of interchange of function, distributes the foreign matter throughout all organs that possess any excretory powers. She loads the blood with it, she lines the air passages of the lungs with it, and also forces it out of the skin.

Wherever nature can oxidise the substances, it is done; but where it accumulates in large quantities, it attacks the delicate tissue of the lungs by a kind of spontaneous combustion.

I think it will be found that certain habits will bring on and continue unhealthy breath, and one of the most common causes is found in persons suffering with constricted, irregular and costive habits of the bowels, and that for its cure, particular attention to regulating this portion of the system is absolutely necessary.

Overloaded and dyspeptic conditions of the stomach are the next causes of unhealthy breath. Let any one who has a tendency to inflamed condition of the mucous coat of the mouth, throat, and surrounding parts, eat an over-full meal of even the simplest substances, under conditions that do not favour the digestion of it and it will bring on the trouble. A hearty meal just before bedtime will probably produce it during the night, so that on awakening in the morning the mouth will be noticeably foul and dry. So also will the tendency be kept up by too frequent meals.

It would be better that we had an interval of six hours between meals, so that the stomach should have time to rest, and the food time to digest.

Articles of food taking five hours to digest cannot be done in three, and no food should be mixed with partly digested material. This, I am sure, is one of the most fruitful causes of inflamed mucous membrane and unhealthy breath.

Spices and condiments, as a rule, should be avoided with food, as they form compounds with animal and vegetable substances, thereby retarding and preventing decay.

A very good rule is: that all articles of food easily decomposed by warmth and moisture out of the human stomach are easily digested in the stomach, and all articles of food which are slow to decompose under such conditions are slow of digestion, the ratio of digestive process being proportionate to the process of decomposition.

Large quantities of fluids are irritants to some people, by floating food and preventing digestion, and if the simple ones as milk and water are, what can quantities of rum, gin and other spirits cause

but an irritation to the mucous membrane, a bad taste in the mouth, and unhealthy breath.

I believe we may get complications from unhealthy breath in the form of phlegm and catarrhal troubles.

Another cause of unhealthy breath is due from want of proper mastication, which is very prevalent in our children, who bolt their food, half chewed. Rule :—If you want your children healthy, teach them to chew their food fine and to eat slowly.

Everything that tends to disturb the digestion, either from internal or external causes, will prevent the cure of this disease. Want of exercise, too much worry and mental strain, and too much sensuality.

To persons who are subject to the direct action of mercury, lead, phosphorus, and some of the dyeing processes, have the mucous membrane and bones of the mouth affected by these metals, and are the subjects of very fœtid odours, and complications of blood poisoning soon follow.

I think that one of the greatest causes of this misfortune which attacks some of the members of our profession, as well as other people, is that brought on by indigestion, caused by imperfect mastication in the hurry of professional life, bringing on an irritative dyspepsia, acidity and flatulence.

To those to whom this disease comes as an infliction, we must tender our regret ; but those whose mouths are nasty by their own filth, uncleanness and dirty habits, we must withhold our sympathy.

We are members of a profession that teaches cleanly habits, and to make our teachings effectual, we must be cleanly ourselves. Preaching is no good without the practice. One cannot conceive how any dentist can approach his patients with a befoulment of onions and tobacco in his mouth ; but disagreeable as this is to most patients, it is quite sweet to those whose clothes as well as their mouths are saturated with the stale odours of second-hand cigars and pipes that some of my friends are in the habit of using, being quite innocent of their faults.

As regards the treatment of this subject, any dentist who discovers that he has a tainted breath should always when working over a patient close his mouth tightly and breath through his nose. Have at hand some disinfectant mouth wash, and keep the mouth frequently rinsed at intervals.

Another palliative is to keep the mouth wet with fresh saliva by



chewing some inodorous substance, as a piece of paper or gum elastic. Do not use cachous, as the remedy is often as bad as the disease.

A very good antidote for offensive breath is the concentrated solution of chloride of soda, six to ten drops in a wine glass of water, to be used after the toilet is completed in the morning. In cases where the odour from carious teeth is combined with that from the stomach, a teaspoonful of the solution in a tumbler of water will act as a charm, a drop of wintergreen being added to make it pleasant.

Patients suffering from this unhealthiness should, after having been advised to use local remedies, study the necessity of taking more active exercise, together with abstinence, inhale and exhale the pure air, oxidize the food and blood that will kill the odours.

In concluding my paper, which I fear may have been dull and uninteresting to some, I emphasize my wish that the members of the dental profession should give more attention to this most important subject.

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### ANOTHER PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

*(Continued from page 550, vol. VII.)*

THE question of membership is one which must sooner or later be enforced upon the governing body of the International Medical Congress, and surely better sooner than later. The basis of such an institution should essentially be broad, liberal and democratic, and that it is so, is apparent from the first of the printed rules :—

“The Congress shall consist of members of the regular profession of medicine, who shall have inscribed their names on the register, and shall have taken out their tickets of admission; and of such other scientific men as the executive committee of the Congress may see fit to admit.”

Such a liberal constitution should, however, be very carefully guarded, so that quacks, charlatans and notorious advertisers may be prevented from enjoying one of the highest privileges of a reputable professional life. There can be no question that several individuals belonging to these classes were admitted to membership of the Congress at Washington, and probably also on previous occasions. From the mode in which registration was conducted, it was simply the

easiest thing possible for any one, whether belonging to the profession or not, to obtain the certificate of membership.

Two of the correspondents of the *Dental Review* (Chicago) give corroborative evidence on this point. One correspondent very justly remarks that "any one filling out a blank, whether truthfully or otherwise, and after paying an admission fee of ten dollars, had the right and privilege of wearing a shining medal, the size of a silver dollar, and had the pleasure of gormandizing for once in his life without any extra charge; and furthermore, had the satisfaction of being introduced as Dr. So-and-So to his Excellency the President of the United States."

One or two instances falling under our own observation will probably add force to our contention for the necessity for some control as to membership.

The issue of tickets for the Niagara excursion to those foreign visitors who had inscribed their names in the book for the purpose was announced to take place in Willard's Hall, which was then the central bureau of the Congress, but at other times was evidently devoted to second-rate amateur theatrical entertainments. While wearily waiting the tardy arrival of the tickets, our curiosity was stimulated as to the identity of the evidently very distinguished foreign visitor, who occupied a position almost immediately in front of us. "Who is he?" everybody asked, only to be answered by a somewhat portentous shake of the head on the part of his neighbour and the whisper, "I don't know; I was just going to ask you." At length, as he mounted on a form immediately in front of the stage whereon were seated the members of the Executive in charge of the tickets and the plans of the sleeping cars, the full magnificence of his personal appearance, both natural and artificial, made him the centre of attraction. A busy officer rapidly rose from his seat, somewhat back on the stage, and entered into a pithy but concise dialogue with the distinguished visitor, which terminated in the rapid disappearance of the latter ticketless and couponless, and muttering a short but forcible word which, despite his strong foreign accent, we recognised as being unmistakably of Saxon origin. Alas! the patriarchal beard, the leontine locks, the frilled shirt, and the other decorative adjuncts, which had, no doubt, hitherto stood him in good stead by impressing the ignorant and the unobservant as to the importance of his personality, now only served to attract the lynx-eyed executive officer, who promptly denounced him as a quack herbalist

of notorious character, practising, or rather malpractising, in a neighbouring southern town, and therefore, in spite of his foreign name and foreign accent, was no foreign visitor, and should never have been furnished with a ticket of membership in the first instance.

We well remember noticing another individual of very remarkable appearance, who persistently pushed himself into a prominent situation reserved for the officers of the Section, when a photograph of the Dental Section was being taken; and, on enquiring as to his identity, we were informed that he was the proprietor of a notorious establishment in New York, which is conspicuous by a large shop front occupied by a horrible and disgusting display of mechanical wax-work figures, designed to give an artistic as well as a realistic illustration of the advantages derivable from prosthetic dentistry. Nor was it easy to express a feeling of surprise and dismay when, on entering the salon of the Arlington during the reception of the foreign visitors to the Dental Section, we observed our genial President warmly receiving an individual, irreproachable as to costume, manners, and even diploma, but whose whole professional life has been more or less connected with advertising institutions, and who is at the present moment intimately associated in the conduct of one of the most plausible, and therefore one of the most misleading, advertising ventures of modern times. This institution is known by a grandiose name which is an insult to, and must be resented by, every respectable American dental practitioner; and is said to be such a success that it has been found necessary to transform it into a company (limited)—very limited we do not doubt. This institution has some remarkable functions. The British capital of this "company" is employed in importing and maintaining otherwise respectable American practitioners in defiance of the provisions of the Dentists' Act, to the prejudice and disadvantage both of the reputable native practitioner and the respectable American dentist legally practising in England. We found that a protest had been lodged against the admission of the individual referred to on the opening day of the meeting, but that the Committee had refused to entertain it, as he had apparently successfully proved that he was not identified with the institution in any way. It soon, however, transpired that he was absolutely present at the Congress, and making use of his present opportunities for engaging fresh importations of young American graduates, whom he assured of the perfect professional respectability of the practice. As it was the intention of the Recep-

tion Committee to present each of the foreign visitors with a photograph of the entire group, some of us felt it our duty to point out that the presence of that individual in the group would render it anything but an acceptable memento of an otherwise very agreeable event. It was also pointed out that his presence at the special social gatherings of the Section would not be conducive to the comfort or the pleasure of their guests. A protest was also signed by a large number of the British contingent, demurring to his admission as a member of the Section. Whatever official action was taken in the matter did not transpire. Suffice it to say, our comfort was not further marred by the objectionable presence of the party in question. The action of the British contingent excited the approving comments of many of the American members, who applauded the existence of a vertebrate character in our midst too often lacking, they said, in their own organisations. A few of our own party, however, surprised us by lacking this character, thus failing to display abroad a function they regularly exercise in their professional societies at home. Mention must be made of the action of one very distinguished fellow-visitor, one of the highest foreign officials of the Dental Section present, who not only refused to sign the protest, but endeavoured, ineffectually it is true, to prevent others affixing their signatures. Painful it may be, but is it not one's duty to note what seemed a lack of moral courage, but what may charitably be construed as a mistaken notion as to professional ethics, on the part of one who should have been our leader, and who, as a past president of the Odontological Society of Great Britain, would naturally be so regarded? Surely we ought to maintain abroad that jealous regard for the professional respectability of those with whom we associate, which we so constantly exercise in our associations at home. Indeed, is it not a manly and an honest act, if not an absolute duty, one owes the open-hearted and free-handed welcome of his professional brethren of another country to prevent their unconsciously extending the right hand of fellowship to those whom, if they knew them better, they would not care to meet professionally on this side of the water, and whose presence would be tabooed in any professional or social gathering at home, from their ineligibility for membership of even so democratic an institution as the British Dental Association?

The remedy for these abuses of the present liberal qualifications as to membership of the International Medical Congress is extremely



simple, and the machinery ready to hand in the officials of the Section, who should be required to issue a preliminary certificate of eligibility from personal or general knowledge of the applicant, and which the latter should be obliged to produce to the General Registrar on applying for membership.

In the case of foreign officers, whose duties are almost purely honorary, this would be no great tax, and prevent an abuse of that hospitality, all the greater in the case of the foreign visitor, since he is absolved from the payment of any dues for membership.

In an earlier part of these papers, reference was made to our somewhat unfortunate experience in the matter of hotel accommodation on arrival in Washington, and therefore it seems all the more incumbent upon us to mention the fact that three of our party, by transferring themselves and their baggage to the "National" at the opposite corner of the street, found excellent accommodation and satisfactory victualling at the moderate sum of ten shillings per day.

The path of misfortune is sometimes rough and thorny, but it often leads to the bright and primrose way. The accidental relation of our adventures to a member of the Washington Committee so excited his sympathy that he promptly secured for me a bedroom in one of the most charming of clubs. The most difficult problem of social life for a stranger in an American city, is how to eat and drink well, and to sleep comfortably. In an American hotel the sleeping may be well enough as a rule; but, to the average Englishman, the eating is usually of a very unsatisfactory nature, while as for the drinking, the non-alcoholic is as abundant in quantity as it is deficient in quality, and the alcoholic is only obtainable at prices prohibitive to the traveller of modest means. If, however, hotel life is unsatisfactory, club life is eminently the opposite, as there the traveller is able to effect that happy combination—the maximum of comfort at the minimum of expense. The club laws, too, are more favourably adapted to showing hospitality to strangers than those generally in force in England. The "straight tip" for the British traveller contemplating an American tour, therefore, is to obtain as many club introductions as possible, as I am certain that some of the most pleasant reminiscences of our party will ever be associated with the Jefferson Club at Washington, the Union League at Philadelphia, the Harvard, the Lotus and others in New York, and the Toronto Club. By a happy accident the Jefferson Club was very centrally situated between the two places of meeting of our

section and the Arlington. Quite a large number both of the American and foreign practitioners were made honorary members with the full privileges of the club during the time of the meeting, thanks mainly to the friendly offices of Dr. Harris and Dr. Noble, of Washington. This unofficial and individual action really contributed more to our comfort, and to our enjoying the society of our American *confreres*, than any of the social entertainments or provisions of the regular Committee,—*verp. sap!*

Last year, in describing the excellence of the social entertainments at the Deutsche Naturforscher und Aerzte Versammlung in Berlin, I expressed the opinion that the English manage the social aspect of a great meeting better than the Americans, and our experience at Washington only served to corroborate that statement. The entertainments were on a gigantic scale, but were frequently somewhat disappointing, if not actually spoiled, simply from a lack of judicious organisation.

On the opening night of the Congress, a public reception was given by the citizens of Washington. On our expressing regret at having missed this, owing to our late arrival, we were informed that we had not missed much, as the citizens of Washington turned up in such force that they annihilated the arrangements for the efficient reception of their guests. As an instance of the truly representative character of the attendance on the part of the citizens, it may be mentioned that the tonsorial artist attached to the Arlington made a point of being present with his wife. This incident recalls the remark of the wife of a leading London specialist, who had occasion to seek the professional services of a dental practitioner during her visit: "It seems to me the Americans overpay barbers, shoeblacks, and the like, and underpay their professional advisers." Many men in good practice only charge a fee of 50 cents. for the extraction of a tooth, which is exactly the sum extracted from me by the boss of an extensive barber's establishment for a darkey's services in hair cutting and beard trimming.

The social event of the Tuesday was the reception by the President and Mrs. Cleveland at the White House. In order to do justice to such a gracious reception, we carefully arrayed ourselves in the purple and fine linen of modern times, and drove up to the White House only to find the portal barred by the most inflexible of policemen. After patiently waiting rather more than an hour without any prospect of finally reaching the presidential reception, owing to

the enormous length of *la queue*, we adjourned to the neighbouring Corcoran Art Gallery, which had been thrown open for the benefit of members of the Congress. A pleasant hour amid the attractions of this beautiful art collection served to assuage somewhat our not unnatural disappointment. The relative attractions of the Art Gallery and the beautiful Mrs. Cleveland may be gathered from the fact that while the attendance at the White House was not less than 5,000, the attendance at the Gallery only numbered 1,275, the majority of whom had already paid their homage at the presidential shrine over the way. The reason of so many members of the Congress being disappointed, in not succeeding to pay their respects to the President, was again mainly owing to the ardour of the irrepressible Washington citizens, who, despite their frequent other opportunities, attended in such force that they shut out many of those for whom the reception was being held. Those, however, who gained admittance were loud in their expressions of the genial manner of the President, and still more of the attractive grace of Mrs. Cleveland.

The Wednesday evening was made memorable by several private receptions given in honour of the visitors, which were eminently successful, and where, despite the unavoidable crush, the liberal supply of delicacies received the efficient attention of the guests. These entertainments would have been more numerous but for the absence of the leading members of Washington society at that time of the year, and therefore the visitors were all the more indebted to those who had (on our behalf) so kindly forsaken the coolness of the summer resort for the broiling heat of the city.

The Local Committee of the International Medical Congress may reasonably congratulate themselves upon the success of the great social gathering of the Thursday evening, though for many it was not much of a banquet. Special tickets of invitation had not only been issued, but were carefully scanned at the entrance, so that the uninvited were not admitted. The Pension Hall is a spacious and elegant building, and was profusely and effectively decorated from the basis of the tall white Corinthian columns almost to the very roof with bunting, in which the flags of all nations were represented. In the centre of the hall, a well-selected programme of music was charmingly executed by the Marine Band. At the far end of the hall the President and some of the more distinguished guests, the breasts of several glittering with the jewels of the various orders to which they belonged, held a kind of informal reception. The intention had

been to form a procession round the hall, and then lead the way to the banquet, but, unfortunately, a premature raid had been made upon the lower end of the hall, which had been shut off by screens, and behind which the tables had been spread along three sides of the square. Any former indecision as to the exact meaning of the "Buffet Banquet," to which we had been invited, was soon set at rest. In this instance it meant an effort to serve 5,000 guests, or at least the greater part of them, at tables at which not more than 500 could be comfortably placed. The inevitable result was a good-natured crush and an indescribable scramble.

As the next Congress will be in Berlin, it may not be amiss to contrast this entertainment with the Stadt Fest there, where 7,000 sat down to an excellent banquet, as described in a "Professional Holiday." The menu of the German entertainment was not a marvel of printing or lithography, but one could easily obtain all that was announced, whereas the elegantly engraved and printed buffet banquet menu only excited a desire for things one could not get.

On the Friday a very charming garden party was arranged for the foreign visitors at Mr. Secretary Whitney's seat some few miles out of the city. A liberal supply of carriages was provided for the conveyance of the guests, who thereby had an opportunity of enjoying some of the beauties of the suburbs and of the surrounding country.

The Reception Committee of the Dental Section kindly afforded the foreign guests of the section a charming opportunity of seeing the principal sights of Washington, by taking them for a drive round the City in a procession of well-appointed carriages. The photograph of the group on the steps of the Capitol, which it was intended should be presented to each visitor as a memento, unfortunately turned out a failure. None the less, however, will the memories of their guests revert from time to time to the moving panorama of such architectural magnificences as the Roman Doric palaces devoted to the State, War, and Navy Departments, the magnificent Ionic colonnade of the Treasury, concealing the vaults bursting with their millions of gold and silver, and the crowning splendour of Capitol-hill; the Capitol itself, with its glorious dome, its marble halls, and its famous library; to the glorious outlook from the western terrace of the Capitol over the winding Potomac, over the lovely gardens and parks attached to the Government buildings, with the pointed and glittering shaft of the Washington Monument



piercing the cloudless sky; or to the more sylvan charms of the "Soldiers' Home" on Columbia Heights, with its charming views.

Certainly, one of the most pleasant events of the week, was the hastily improvised but very successful supper offered by a few of the American practitioners to the foreign members after the closing meeting of the Dental Section. It afforded an excellent opportunity for the expression of many sentiments to which we could not give adequate utterance in the more formal proceedings of the Section. Speeches were freely indulged in, and the polyglot nature of the entertainment was evidenced by these being in French, German and Scotch; indeed, one irrepressible visitor endeavoured to give voice to the sentiments of the absent representative of Ireland in what was meant to be, but was not, choice Irish. Speechifying was conducted on the true American principle, which I must confess to thinking very trying both to speakers and audience. There is no regular toast list, and the chairman, after a few words of introduction, simply calls upon a special individual to speak. As on this occasion nearly all the visitors were called upon in turn, the result became somewhat monotonous, mainly from the lack of any diversity of subject on which to speak, and thus many of our members, who are really good and effective after-dinner speakers, failed to achieve their usual success in this direction. It must be confessed, however, that the chairman, Dr. Shepherd, of Boston, acquitted himself of his very difficult task in a thoroughly masterly manner. As the night, or rather the morn, advanced, however, the speechifying became somewhat irregular, which gave the visitors an opportunity of sampling the eloquence of many of our entertainers, an eloquence which enlightened us as to some of the prominent characteristics of the various States, of which we might otherwise have remained ignorant. The only thing which marred in any way this jovial entertainment was the absence or too early departure of some of the guests, who had already begun to be attacked by what was facetiously known as "Congress malaria."

*(To be continued.)*

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### ODONTOLOGICAL SOCIETY.

THE ordinary monthly meeting of the above Society was held on the 6th ult. at 40, Leicester Square, Mr. S. J. HUTCHINSON (Vice-President) in the chair.

Mr. Hutchinson read a letter from the President, Mr. Daniel Corbett, regretting that ill health and bad weather prevented his attendance, and hoping that he would be able to be present to read his Inaugural Address at the March meeting.

The Librarian reported several presentations to the library, including Mr. Christopher Heath's Lectures on "Certain Diseases of the Jaws ;" "Note Book for Dental Students," by Mr. James Rymer ; "The Proceedings of the Royal Institution;" "Footprints of the Profession," being an Address to the Maine Dental Society ; and two pamphlets by Dr. Magitot.

The Curator said that they had added a very fine specimen of a Tetradont to their collection. Mr. Howard Mummary presented the skull of a rabbit showing injury to the pulps of incisor teeth some long time previous to death. There was also a case of dilaceration of the incisor teeth of a porcupine, which was similar to the rabbit just mentioned.

Dr. W. ST. GEORGE ELLIOTT made a "casual communication" on "A System of Crowns." Previously he had had something to say on the advisability of crowning teeth. Many, doubtless, had looked into the subject, and those who had done so would certainly have recognised that it was advisable. He was of opinion that of all operations there was none which gave so much satisfaction both to patient and operator, a statement which could hardly be made of bridge work and some other methods. It would be remembered that Dr. Knapp wrote an article for the *Dental Cosmos*, in which he described an elaborate system for making crowns. When Dr. Knapp was in London he gave a demonstration, at Dr. Elliott's invitation, and it was considered very successful (see DENTAL RECORD, vol. vii., page 344). But while the exceedingly artistic character of the work was admitted, the length of time required (five hours) made it a somewhat impracticable operation, the crown being entirely of gold. Dr. Elliott had adopted a method which was a great saving of time, and he claimed for it equal advantages in point of efficiency with Dr. Knapp's system. It was somewhat allied to the principle of the Richmond crown, the cardinal feature of which was the fixing a gold cap or lid upon the stump of the too'h, the stump having been cut away nearly to the alveolar margin of the gum. But there was the objection to this plan that the gold was frequently visible. Dr. Elliott recommended his own process as exceedingly simple. In the first place it was not necessary, as by the Richmond method, to cut away

the whole of the remaining portion of the stump. He always allowed every portion of the tooth remaining to assist in holding the crown, providing it was not in the way. An impression of the stump and the bite was taken, then a process similar but not exactly the same as suaging was followed, which gave a cap the exact copy of nature.

Mr. REDMAN (of Brighton) could fully endorse, from his own practical experience, all that Dr. Elliott had said, but found the best plan for getting a proper occlusion plate was by Dr. Knapp's process.

Dr. G. CUNNINGHAM (Cambridge) said, with regard to the system of capping the crown, he confessed that while æsthetically the system recommended by Dr. Elliott looked better, for getting thorough occlusion nothing could excel, in his opinion, the use of the gold ferrule without the cap, and with or without How's screws in the root canals, and filling up the cavity with amalgam. With reference to taking a model of the root, he had lately adopted a modification of the Herbst method for using the matrix, and thought it better than the wire method.

In connection with the system of using ferrules in crowning teeth, there was one point in its favour—viz., that the ferrule made the operation of crowning possible in many cases which had passed beyond the stage where the pivot method was applicable.

Dr. MITCHELL regarded anything in the way of models as a waste of time, and described his own method of striking up tops, by which he was able to reduce the time taken to produce a gold crown from five to one or two hours. He thought that two hours was long enough for any operation in gold crowning.

Mr. J. SMITH-TURNER was very much struck with some of the views expressed on the subject. It seemed to him that the operation of cutting away part of the tooth, putting a ferrule round the root and pushing it well down to the gum, instituted that very condition of things which they were told to avoid when plugging a tooth.

Dr. FIELD: Perhaps Mr. Smith-Turner forgot that in filling or plugging a tooth they were in most cases dealing with teeth not very far advanced in decay, whereas in crowning the tooth they were dealing with the merest shell.

Dr. MITCHELL remarked that in the case of the stopping or filling they had more or less rough material upon the gum; in the other they had a highly polished bank.

Dr. CUNNINGHAM said that, like Mr. Smith-Turner, he had been

brought up in the orthodox school, but having seen very successful results from Dr. Elliott's method, and practically experienced the advantage of it, his first prejudices had been overcome. He thought the answer to Mr. Smith-Turner was that the periosteum did not descend down to the neck of the tooth for some considerable way.

Mr. SMITH-TURNER was still of opinion that his position had not been assailed.

Dr. ELLIOTT said that, in the first place, his was not a new-fangled notion. He had seen crowned teeth fifteen years ago. He had never met with failure of a crown nor any dental irritation.

With regard to the nitrous oxide blow-pipe, Dr. Rollo Knapp claimed to be the inventor, and he patented the invention both in America and in England. Whether his conduct had been in accordance with their notions of propriety, he (Dr. Elliott) would not say. But this he would say, that one of the members of the Odontological Society, Mr. Hunt, of Yeovil, used and described the use of the nitrous oxide blow-pipe nineteen years ago for melting gold. He would add, however, that the whole thing was very simple, a bottle of nitrous oxide and an ordinary blow-pipe being all that was required.

Mr. BLAND SUTTON read a short paper in connection with his previous paper on "The Classification of Odontomes." Two days after reading that paper a "thar," or Himalayan goat, died in the Zoological Gardens with a large suppurating mass involving each upper jaw. Beneath the right orbit existed a sinus discharging pus. The upper molar teeth were defective, and in the middle of each alveolar border there was a large recess leading into the antrum. These recesses contained a considerable quantity of fine chaff and hay. A longitudinal bisection showed that each antrum contained a cyst with dense thick walls, the outer shell being of bone, lined with thick fibrous tissue, and the interior being filled with denticles, fragments of cementum, and bone of varying sizes amounting to nearly 300.

A careful study of the specimen had convinced him that all those remarkable cases included in his list as "anomalous" odontomes had their origin in aberrant follicles of that nature. He therefore proposed to include "anomalous odontomes" under the term "Compound Follicular Odontomes" in section B of his previous paper. The case further justified him in including dentigerous cysts among odontomes. Having described the characteristics of Follicular Cysts, Fibrous Odontomes, and Cementomas, he concluded by saying that the



specimen which formed the subject of the paper was further interesting as confirming his opinion that the hard tumours seen in museum, only represented half the case. Every odontome had a periodontal capsule on which it depended for nutrition. When the cysts suppurated the capsule became destroyed, the hard part necrosed, and in ordinary cases sloughed out. Odontomes were practically teeth, and, like teeth, underwent eruption. The suppuration usually attendant upon this was frequently the first indication of trouble.

Mr. S. J. HUTCHINSON asked if many of the denticles contained true cementum, and if any contained dentine.

Mr. BLAND SUTTON replied that some contained cementum, not many, and it was uncertain whether any contained dentine.

Mr. C. S. TOMES said he would like to ask Mr. Bland Sutton a question with regard to this most remarkable and completely described odontome. Mr. Sutton said that in it there appeared a mass which resembled alveolus. Did not this put it in the classification of ovarian tumours, where there would be a large amount of bone formation?

Mr. BLAND SUTTON replying, said that in all those cases in which dentigerous ovarian cysts containing teeth had been described, skin containing hairs, muscle, &c., might be associated with them, but in the present case none of the characteristics of ovarian tumours presented themselves.

Mr. STORER BENNETT begged leave to point out that there was rather a closer connection between ovarian tumours and odontomes than was supposed. Mr. Sutton had said that ovarian tumours had hair in connection with them. It so happened that he (Mr. Storer Bennett) had met with an odontome taken from a pig in which a number of bristles were distinctly visible.

Mr. BLAND SUTTON thought that Mr. Storer Bennett had probably mistaken whisps of chaff, grass, or hay for hairs.

Dr. A. W. HARLAN, of Chicago, then read a paper on

#### THE TREATMENT OF PULPLESS TEETH FROM THE POINT OF VIEW OF EVERYDAY PRACTICE.

Dental surgeons were everywhere devoting much of their thought, ingenuity and energy in the direction of maintaining within the mouth many pulpless teeth that in former times were needlessly extracted.

Out of this growing conservative tendency had grown various

procedures; some designated by their authors "mechanical methods," and others "the immediate dressing and filling method," and still others as "the time dressing, or therapeutic expectant, method." This variety of treatment would be a danger to the student and inexperienced surgeon unless directed by a strong hand.

Pulpless teeth were found in all the "seven ages of man;" even the teeth of the first dentition did not escape the ravages of caries, nor was slow death of the pulp, or its destitution by other means, unfrequent.

Pulpless deciduous teeth and roots might properly be retained for mastication up to or about the time of the expected eruption of their successors.

For the convenience of handling the subject, he would divide it under the following headings:—1, teeth deprived of their pulp by means of corrosive medicaments, or immediate operative procedure, cautery, broaches, wooden points, anæsthesia, or accident; 2, death of the pulp as a result of capping from rapid thermal changes; 3, death from partial laceration, as from a blow or fall, or from torsion in correcting irregularities, or from imperfect or partial extractions and replacement of teeth; 4, death from gradual exposure by caries or some form of abrasion or erosion; 5, death from exposure through salivary deposits, exposing the apices of roots by displacement of tissues, or from the development of pockets resulting from the so-called "Riggs' disease" and their extension to or around the apices of roots; or death by irritation due to pulp nodules, or strangulation, and from unknown causes.

The classification, imperfect as it was, would suggest that no single method would suffice to meet all the various pathological conditions.

From a somewhat extended experience, covering a period of nearly twenty years, he had a record, not of hundreds, but of thousands of teeth treated and their roots filled with few recurrences of fistulæ or abscesses.

His method of procedure was, for Class 1, three things to be insisted upon. (a) Complete disinfection, nothing being allowed to enter the pulp chamber that was not placed there by his own hands, by means of clean and sterilized instruments. Water and saliva to be rigidly excluded. (b) No powerful coagulators of albumen to be introduced into the pulp chamber prior to removal of the pulp. (c) Any incorporation of antiseptics or disinfectants with the filling to

be avoided. Having destroyed the pulp by any of the methods referred to, extirpation followed; in the case of fractured teeth cessation of hæmorrhage should be waited for. Then the pulp chamber should be syringed with equal parts of peroxide of hydrogen and a  $\frac{1}{10000}$  solution of bichloride of mercury until the canals were free from blood and serum. The root should then be dessicated with absolute alcohol and heated air, and filled at once. If the pulp had been destroyed by arsenic or similar agent, a dressing of tannin and glycerine should be applied to the devitalized pulp, first puncturing it to allow any congested blood to escape. The dressing should be covered with gutta-percha, perforated in two or three places, to allow of the escape of confined air. After eight days the dressing should be removed, the rubber-dam placed over the tooth, and the pulp extirpated with suitable sterilized broaches. The pulp chamber should then be thoroughly washed with the solution mentioned, and the root filled at once. The roots should not be drilled, but access obtained by freely opening the pulp chamber.

Class 2. There was little difficulty in diagnosing this class, one of three conditions always being present, viz., encystment of the apex, a dormant or cold abscess, or a fistulous tract leading from the end of the root externally.

*Treatment.*—For encystment, disinfecting dressing and immediate root filling. For dormant abscess, the rubber-dam being adjusted, the tooth and drill should be bathed in terebene, the pulp chamber entered, and the contents at once bathed with a penetrating disinfectant, which should be allowed to remain for a few minutes. Roots should not be drilled unless they were carious. Cotton wool saturated with some essential oil should be packed lightly in the root and the pulp chamber filled with dry cotton, over which should be packed some soft gutta-percha perforated for the escape of gases. After ten days the dressing should be removed. Absence of gas or moisture would show whether the abscess had disappeared. Either being present, the treatment should be repeated. The value of an essential oil dressing was that the reproduction of tissue was stimulated.

The introduction of a powerful coagulator of albumen would be most disastrous without providing for drainage. It would be far better to cut through the gums and alveolar process and provide an outlet at once. Time would always be a factor in the destruction of microbes, and the disinfection of infected dentine was a matter of no small importance. The practice of leaving antiseptics and disin-

fectants within the root canal or pulp chamber as a safeguard against future trouble was delusive. In cases of fistulæ, disinfection and immediate filling was generally possible.

Class 3. Treatment same as Class 2.

Class 4. In death of the pulp from abrasion or erosion, in nearly every instance the roots would be found to be encysted; in such cases immediate filling might be proceeded with after thorough disinfection.

Class 5. In this class immediate filling was not desirable when the teeth were to be retained. Dr. Harlan advised cleansing the canals as in Class 1, then packing the roots with threads of cotton wool saturated with a mixture of olei cinnamomi 20 minims, olei gaultherii, terebin. aa 30 minims, and seal the crown cavity with hard gutta-percha. The dressing should be allowed to remain from one to six months, and the root then filled permanently.

Class 6. Circumstances generally pointed to the necessity of temporary root dressings to prevent pain and swelling.

Dr. Harlan, in conclusion, said he was not unmindful that certain complications might and did arise. Certain relief was always afforded by drilling directly into the pulp chamber, a course to be preferred to drilling through the alveolar process.

After entering the pulp chamber and gently removing the pulp under antiseptic conditions, great comfort would be given to the patient by painting the dried gum with equal parts of chloroform, tincture of aconite and tincture of iodine, and the immediate administration of 1-10th gr. pills of calcium sulphide every fifteen minutes, until four or six had been taken. Occasionally pulpless teeth were elongated, and closing of the jaws gave pain. This might be obviated by grinding the occluding surfaces. Much of the success in the management of pulpless teeth Dr. Harlan attributed to the thorough removal of all pulp tissue and other foreign matters, and the fidelity of filling the roots with a substance neither porous nor corruptible by the fluids of the mouth.

The CHAIRMAN said Dr. Harlan had brought forward the subject in such a masterly manner that he felt sure many of the members would be desirous to speak upon it, and he trusted that as there was not much time at their disposal for discussion, they would not allow the moments to slip by unutilised.

Dr. MITCHELL strongly supported the part of the paper which laid special stress upon the importance of cleanliness, and regarded it



as one of the important factors towards success. With reference to the common practice of filling teeth with antiseptic dressings, he had known cases where it had been necessary to refill such teeth, and the offensive odour emitted from the removed dressing was a sufficient condemnation of the practice. There was nothing like doing a thing thoroughly that was worth doing at all.

Dr. ST. GEORGE ELLIOTT showed and described a combined syringe and washing apparatus for treating and washing dead teeth. It was made with a spring, had an ordinary nossle for ordinary use, and also two platina nossles. By means of this syringe it was possible to pass water backwards and forwards in the nerve canal until it was thoroughly cleansed. There was a still finer nossle which Dr. Elliott claimed could be passed two-thirds of the way up the canal and remove the greater part of the *débris*. He did not see why it should not be possible to pass gutta-percha up the canal and allow it to do its own filling.

Mr. C. S. TOMES thought that in their daily practice in dealing with a septic condition of the teeth they ran some danger of losing sight of what they had to do with. He was by no means sure that Dr. Harlan, in his free use of antiseptics, had not once or twice done so. In the first place, during operations in the mouth, an aseptic condition was almost impossible. He wished particularly to call attention to the point that they were told to sterilize their instruments, but if anyone hoped to puncture with an antiseptic, let him try how far an ordinary instrument would pierce into the dentine, and they would find it would make very little headway indeed. Dr. Harlan mentioned the necessity of observing a series of precautions in cleaning out the tooth; then he put the stopping in and covered it with gutta-percha, in which he bored holes. He (Mr. Tomes) thought that in treating such a tooth they would do well to dismiss from their minds the possibility of attaining perfect aseptic conditions. He wished merely to sound a note of warning, not to talk about something impossible of attaining, and forget more practical considerations, which would lead to more practical success.

Dr. FIELD had had some good results in his own practice by the adoption of the method set forth by Dr. Harlan, but with occasional failures for which he could not account, which would discover themselves sometimes after three months, sometimes after three years. He was of opinion that success depended on delicacy of manipulation, not

permitting the fine-pointed instruments to puncture beyond the apex of the root. He wished to say a word in support of the old method. He had seen the roots of teeth filled with nothing but cotton wool and creosote that had stood for years, so that in point of fact, although complete, antiseptic conditions were not obtainable. The closure of the foramen had been obtained, which led him to the conclusion with which he started—viz., that whether they filled with one material or another, the main point seemed to be delicacy of manipulation. If this were secured, he believed they might use half-a-dozen different filling materials and obtain satisfactory results.

Dr. WALKER said perhaps it would afford the Society some little pleasure to be reminded that the subject dealt with by the paper was no new thing; that so far back as 1865 their then President, their present Treasurer, Mr. Thos. Arnold Rogers, who was with them that evening, and would no doubt have spoken but that he was very unwell, read a paper on that very subject, and any member who felt interested in the subject, by turning to the volume of the "Transactions" for 1865, could read for himself. Mr. Rogers there gave a long account of how he filled and treated roots; he showed his instruments to the Society and gave them records of his own treatment. He (Dr. Walker) had the pleasure of co-operating with him at that time, and it was only a few weeks ago that the speaker saw a canine he had plugged in 1871 by the method advocated in 1865 which was then in good condition. He had followed out the plan of not filling with cotton but with metal to the apex of the root, and he fully bore out Dr. Harlan's view that if sound roots were filled with metal good results would be obtained. He had seen Dr. Harlan's work in Chicago, and he was struck with the very great care he exercised, especially in preventing moisture returning to the roots after treatment.

The discussion was continued by Messrs. T. A. Rogers, Hern, Walter Harrison, Lloyd Williams and R. H. Woodhouse.

Dr. HARLAN, in replying, said with reference to the remarks of Mr. Tomes, he felt sure that they would agree with him that in order to protect gelatine or any other substance from microbes and their spawn, the cotton wool was the very best substance to stop the tubes with, and it would not matter if the cotton wool should not be dry. It was not expected that the wool would remain dry for more than a moment, with the perforation in the gutta percha cap; but it would intercept and prevent any bacterium flowing into the pulp-chamber. Mr. Hern appeared not to have followed the portion of

the paper which dealt with cleansing and disinfecting. He objected to his (Dr. Harlan) using essential oils, saying the oils were incompatible with water. If Mr. Hern had followed the paper carefully, he would have seen that the parts were cleansed with peroxide of hydrogen or corrosive sublimate solution and thoroughly dried. Then again, when a strand of cotton wool was interposed, saturated with some essential oil below body heat, he would agree with him that that became at once a non-irritating and permanent disinfectant, as distinct from an antiseptic as a disinfectant could be. He was afraid he was unable to agree with Mr. Hern in reference to disinfecting by mere drilling. He would reply to Dr. Walker, that the practice of drilling or reaming roots would never become universal. With reference to wooden points, he would remind Dr. Cunningham that he (Dr. Harlan) had published eight cases, and he was bound to say that six out of the eight patients had threatened to leave him never to return.

After the usual vote of thanks, the Society adjourned.

### **ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.**

At the December Meeting, the PRESIDENT (Dr. Williamson) exhibited a unique case of fracture of the right central incisor in a gentleman of about forty-five years of age. There seemed to be a fracture of the dentine at one part and a fracture of the cementum at another. The dentine fracture was an irregular oblique one, upwards and backwards, the surfaces being quite sharp and seemingly without secondary deposits from either cementum or pulp. The cemental collar seemed to be the ordinary layer, of about the normal thickness. On the outside, opposite the site of dentinal fracture, there was not the slightest vestige of thickening, while on the inside the irregular fractured surface of the dentine retained its sharpness at its junction with the cementum. The depth of the collar was rather irregular, averaging fully one-sixteenth of an inch, but it was unfortunately deficient on the labial aspect, that portion having been broken off. The pulp cavity in the region of the fracture was found to be completely filled with secondary deposit. Re-union had therefore taken place by means of the cementum, and also by the calcified pulp.

At the January Meeting Mr. AMCORE opened a discussion on

"The Use of Cocaine in Dentistry." Like others, he had had his successes and his failures, and in one or two cases unpleasant consequences; but taking it all in all, he would not be inclined to continue its use in the ordinary cases of tooth extraction.

Mr. G. H. WATSON said his experience of cocaine led him to think that it was not at all to be depended on. The great disadvantage of cocaine for tooth extraction was the amount of time taken up in injecting. Taking all things into consideration, he thought cocaine should be used very cautiously, the dose being always freshly mixed, and in amount 1 grain to 10 m. of water.

Dr. SMITH said his experience of cocaine was considerable, but without a great deal more he did not feel warranted in expressing any pronounced opinion upon it as an anæsthetic in dentistry.

Dr. WILLIAMSON observed that the time occupied in injection and waiting, combined with the uncertainty of the result, was sufficient to condemn its use for that purpose, except in very exceptional cases. The position of nitrous oxide, as the dental anæsthetic, was not in the least disturbed by the introduction of cocaine.

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### BRADFORD AND DISTRICT DENTAL ASSOCIATION.

THE annual business meeting of this Association was held on the 10th Feb., in the Eye and Ear Hospital, Bradford. In the absence of the President, Mr. A. Cocker, L.D.S., of Halifax, was voted to the Chair. The Treasurer's report showed the Association was in a very healthy condition, there being a good balance in hand. The work of the Society during the past year has been of a very practical and interesting character. Papers have been read by the following members:—"Hæmorrhage and its Treatment," by Mr. A. Cocker, L.D.S.Edin.; "Notes on Cocaine," by Mr. A. B. Wolfenden, L.D.S.I.; "The Treatment of Pulpless Teeth," by Mr. A. Alex. Matthews, L.D.S.Eng., of Bradford; while many valuable and interesting communications have been contributed by Messrs. A. Howarth, A. A. Matthews, T. B. Barnby, J. Taylor, C. Rippon, I. Renshaw, and others.

The retiring officers were thanked for their services.

The election of officers for the year 1888 resulted as follows:—*President*, Mr. G. J. Kirk, Bradford; *Vice-President*, Mr. A. M.



Matthews, L.D.S.Eng., Bradford; *Treasurer*, Mr. T. B. Barnby, L.D.S.I., Bradford; *Secretary*, Mr. A. B. Wolfenden, L.D.S.I., Halifax; *Committee*, Mr. Arthur Cocker, L.D.S.Edin., Halifax; Mr. C. Rippon, L.D.S.I., Huddersfield; and Mr. J. Taylor, L.D.S.Edin., Dewsbury.

Mr. A. Howarth read a very interesting paper on the "Care of the Teeth of Children," and was heartily thanked. The proceedings ended with a vote of thanks to the Chairman.

## EXAMINATION QUESTIONS.

### ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following questions were set at an Examination for the Diploma in Dental Surgery on February 20th, 1888 :—

#### ANATOMY AND PHYSIOLOGY.

1. Describe the relations of the Parotid Gland.
2. Describe the course, relations, and distribution of the Lingual Artery.

#### SURGERY AND PATHOLOGY.

3. Describe the process of Ulceration and Repair.
4. What symptoms indicate the impaction of a foreign body in the Oesophagus? How would you treat it?

#### DENTAL ANATOMY AND PHYSIOLOGY.

1. How far does the Dentition determine the contour of the Face?

Illustrate your answer by reference to the teeth of men and of animals.

2. Describe briefly the microscopic appearances to be seen in a transverse section of a fresh incisor at its neck :—

(i) Under a magnifying-power of 25 diameters.

(ii) " " " 300 "

3. Describe the anatomical conditions which render possible the reunion of an extracted tooth with its socket.

## DENTAL SURGERY AND PATHOLOGY.

1. Enumerate the Tumours occurring upon the Gums. Describe briefly their structure and treatment.

2. What is a V-shaped Maxilla? What opinions are entertained as to its connection with mental deficiency?

3. Describe the several casualties which may arise during and after the Extraction of Teeth, giving the appropriate treatment.

**PASS LIST.**

## ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following candidates were admitted L.D.S. on February 22nd :—Douglas Howard Harris, 34, Bedford Square, W.C.; Herbert George Henry, 38, Wellington Square, Hastings; Francis John Lankester, L.R.C.P., M.R.C.S., High Street, Leicester; Richard Fairfax Reading, L.R.C.P., M.R.C.S., Elizabeth Street, Hyde Park, Sydney, N.S.W.; Charles Henry Smale, 118, Oxford Street, Manchester; Francis Henry Morgan Van der Pant, Kingston-on-Thames.

One candidate was referred.

## ROYAL COLLEGE OF SURGEONS, EDINBURGH.

DURING the January sittings of the Examiners, the following gentlemen passed the Final Examination, and were admitted L.D.S.Edin.:—Edward Arthur White, M.D.Aberd., &c., Norwich, and John Turner, Edinburgh.

## FACULTY OF PHYSICIANS AND SURGEONS, GLASGOW.

AT the January meeting of the Dental Examiners the following gentleman was admitted L.D.S.:—William de Brassey Woodburn Glasgow.

**OBITUARY.**

WE regret to announce the death, which took place on January 11th, of James Merryweather, M.R.C.S., at an advanced age. He was connected with the early movements of Dental Reform, and was for many years Consulting Dental Surgeon to the National Dental Hospital.

## Editorial.

### POST-GRADUATE TEACHING.

WHILST the sum total of knowledge is gradually increasing, there becomes more and more apparent the inability of individuals to deal with this vast accumulation. As a consequence there arise divisions and sub-divisions of labour in the boundless field of phenomena; yet, further, it is found that even the student of a specialty, when he has completed the prescribed curriculum of his education, and obtained a qualification, has merely been fitted with the necessary mental implements or groundwork with and upon which a still higher superstructure may be built, viz., that which will qualify him for at least keeping up, and if possible raising, the level of improvement which has been attained. To enable the post-graduate student to acquire information in collateral subjects and of the latest advances, special courses of instruction have in recent times been organised. Such has been the case with many branches of Medical Science—medicine, surgery, throat, skin, eye, gynecology, nervous system, &c. It is satisfactory to learn that the Dental specialty is also to be abreast with the times in this movement. The two Metropolitan Schools are to have post-graduate courses of lectures and demonstrations. Unfortunately, the one school will be quite independent of the other in the work. From a professional aspect—and the good of the profession is the liberal standpoint from which work of this kind can be most satisfactorily viewed—better results could readily have been anticipated had the two schools combined their energies and jointly selected the teachers. The great success of the courses at Charing Cross is probably in no small measure due to the fact that the lecturers are not necessarily members of the staff of that School. The series are, we believe, merely under the auspices of the School, and therefore, cosmopolitan. However, there will thus be presented to members of the profession, who desire opportunities of that kind, the means of becoming acquainted with some of the latest improvements and methods in Dental Surgery.

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### GOSSIP.

FROM the researches of Dr. Edkins we learn that the Babylonians, in the 16th century, B.C., could extract the cube and square roots of numbers. The first Chinese example known is dated B.C. 542. It is probable that the principle of local values in arithmetical notation found its way into China through the Phœnician traders, whence also was acquired the knowledge of the Clepsydra, or water-clock, Astronomy and Astrology.

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PROFESSOR RAMSAY suggests that colour-blindness is caused by a particular defect in the brain, and not in the rods and cones of the retina; in other words, as with sounds, so with colours, there is a want of power of interpreting the impression conveyed to the brain.

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A MACHINE has been patented in Germany for making tubes from solid metal blanks. It consists of a pair of truncated conical rollers, on which are cut a series of spiral grooves. The larger ends have a plain portion, by which the surface of the tube is made smooth and bright. The rollers are mounted horizontally, but not in the same vertical plane—that is, they are slightly inclined to each other. The motion of both rollers is as the hands of a clock. The metal blank is grasped by the smaller end of the rollers, and in its passage between them the outer portion of the metal moves faster than the inner and so forms a tube. The last portion passing through the roller solid, one end of the tube is closed. Passing the blank half-way, and then turning it end for end, a tube can be produced having a solid portion midway in its length. The forces acting in this process are somewhat complicated, and cannot be explained without a diagram.

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THE habits of a running spider, indigenous to the South of Europe, have lately been studied by Herr Beck. He tells us it makes a vertical hole in the ground about ten inches deep, and this, with a small earth-wall sometimes made round the mouth, is lined with a web. A little way down is a small lateral tunnel; in this the creature lies in wait, and when an animal falls into its tube and has reached the bottom the spider pounces upon it. The bright phosphorescent eyes of the spider turned upwards tell when a tube is tenanted. In fight, the spider erects itself on its last pair of legs,



striking with the others. The children of Bucharest angle for these spiders with a ball of wax attached to a thread. This is lowered to the bottom of the hole, and when seized upon by the spider it is withdrawn; another thread is passed round one of the legs, and the animal is played with.

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CAPTAIN WIGGINS, who made the voyage from Europe to Siberia, states that at Zensiesk, in October, the temperature varied between  $70^{\circ}$  and  $80^{\circ}$  below zero. The mercury was frozen in the bulb.

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A METHOD has been introduced by Professor Martin, of the John Hopkins' University, Baltimore, of isolating the mammalian heart, and of making observations on its activity for several hours when isolated from the body and connected only with the lungs. One result has been to show that the heart, when separated from all its nerves, works quicker when the temperature of the blood is raised, and slower when it is lowered. Also, an increase of pressure in the aorta was found to be without effect, whereas an increased venous resistance increases the cardiac activity.

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THE researches on the breath of man and other animals, by Brown Sequard and d'Arsonval, make it evident that the air exhaled by them, even in a healthy state, contains a very powerful toxic element, apart from  $C O_2$ , to which probably is due the bad effects caused by breathing a close atmosphere; and further investigations lead to the conclusion that this volatile organic poison is an alkaloid. Its molecular composition has not yet been determined.

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ONE of the brittle star fishes (*Amphiura squamata*) is frequently the host of a parasite—a Crustacean of the order Copepoda. It is found in the brood sac of its host, and probably destroys the ova, as the ovaries only appear as an amorphous mass. Girard and Bonnier interpret this as an instance of parasitic castration, in which the reproductive powers of the host are destroyed for the future good of the offspring of the parasite.

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A NOVEL application of cold is the freezing of a stratum of moist sand, by which it is made hard enough to be excavated like rock. In this way a mine shaft is being successfully sunk in Belgium,

through a stratum of moist sand met with at a depth of 70 metres. Chloride of magnesium and ammonium is the fluid employed, and the degree of cold produced by the expansion of the ammonia is marked by a thermometer at 8° cent.

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By the use of argentic bromide paper, it is stated that 360 prints may be obtained in an hour from one negative.

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THERE has lately been presented to the Paris Museum the fossil remains of a gigantic turtle, the carapace of which is nearly 50 inches long. It was discovered by Dr. Donnezan during some recent excavations connected with the erection of the fortress of Serrat, in the Eastern Pyrenees.

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DR. BADDE has developed a mathematical formula by means of which he can determine the vibrational condition, not only of a vibrating string, but also of a square plate. This makes it possible to determine the relation between the pitch of a note and the vibrational amplitude of the vibrating plate.

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THE death of Dr. Balfour Stewart has removed from the list of scientists one of the most brilliant philosophers of the present century. By his treatise on "Heat"—one of the best in any language—his memory will ever be preserved. His speculations in physics were all of a somewhat transcendental character, and therefore hard to reduce to forms in which they could be experimentally tested. He was one of the authors who, in connection with Professor Tait, produced the work called "The Unseen Universe."

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TELEGRAPHIC communication from a distant station to a railway train in rapid motion is *fait accompli*. It has been worked out by American scientists, and is now in operation on Lehigh Valley Railway, fifty miles of which have been fitted with the necessary arrangements. An ordinary telegraph wire, insulated on poles about eight feet from rails, is employed in transmitting the current from the battery, while the metallic roofing of the carriage, or a tube or rod half-an-inch in diameter, carried along the eaves of the carriages in the place occupied on English railways by the cord connecting the guard's van with the engine, has a current induced in it in an

opposite direction according to well-known laws. The current, which is very feeble, is strengthened by relays,—that is, by interruptions of the current, as in the ordinary medical coil. The acoustical instrument is a buzzer. The sound produced by this is broken by means of a Morse key into the usual signals for letters. These sounds are heard through the intervention of a telephone, which is strapped to the head of the official, and by him they are interpreted.

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MR. F. J. LANKESTER, L.R.C.P., M.R.C.S., L.D.S.Eng., has been appointed House Surgeon, and Mr. T. S. Minett Assistant House Surgeon, to the National Dental Hospital.

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MR. HENRY C. CARTER, L.D.S.I., has been elected Dental Surgeon to the Dudley Stuart Home, Paddington, W.

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MR. W. J. FISK, L.D.S. Edin., has been appointed Dental Surgeon to the London Orphan Asylum, Watford; salary, £20 per annum.

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THE Triennial Dinner of the Social Dental Society was held at the Temple Hotel, Arundel Street, Strand. All the members were present. Mr. Alfred Smith, L.D.S.Eng., the President for 1888, was in the chair. After dinner and the usual toasts, a first-rate programme of music and singing was given by the various members, and a very pleasant evening was enjoyed.

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DR. J. BURNEY YOE, writing in the *Nineteenth Century* for March, on "Long Life and How to Attain it," says of centenarians:—With regard to teeth, as might have been expected, a great number had none, viz., twenty-four out of forty-three; many others had two or three left; but what is interesting in this connection is the existence of a few remarkable exceptions; in one instance it is reported that they "all came out whole," which means that the gums receded and the bony sockets of the teeth disappeared without any decay in the teeth themselves. *Three* females had a complete set of 32 teeth; one of these, a Frenchwoman living at Nantes, was 108 years of age, and had a daughter living 86 years of age, and as evidence of great vigour and healthiness of constitution, it is mentioned that she had

good bony union of a fracture at 104. The second, who possessed a complete set of teeth, was a farmer's wife near Cork, and a third, a farm labourer at Shields, aged 100 years.

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ANOTHER old woman (101), whose occupation was that of a village grocer, possessed seventeen teeth, but they were very unequally distributed, for while she retained all the teeth of the lower jaw (16), she had only one left in the upper jaw, and this is in accord with the generally observed tendency for the teeth of the upper jaw to decay and disappear first.

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A FARMER at Limerick, aged 105, retained sixteen teeth; he is also stated to have broken the neck of his thigh bone at 101. Since then he had gone on crutches. Another Irish farmer at Michells, 101 years of age, retained twenty-four teeth.

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NOTHING is more noteworthy than the remarkable testimony of the almost universal possession of good digestion by those who live to a good old age.

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THE Library of the British Museum, in 1887, contained 120,000 volumes, or nearly 40 miles of shelves.

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G. STICKER concludes from his observations (says *The Lancet*) that the notion that the salivary secretion plays no part in gastric digestion is erroneous; that, on the contrary, the presence of saliva in the stomach has a direct effect in promoting the secretion of gastric juice. The deduction was made from a case which presented a marked deficiency in the salivary secretion, and in which an examination of the contents of the stomach proved that the gastric juice was diminished in quantity, and proteolysis impaired. By administration of jaborandi the saliva was increased in amount and the digestive powers restored. Since it is not known that this drug has any effect upon the secretion of gastric juice, it was inferred



that the restoration of the latter was due to the entrance of saliva into the stomach. A simple experiment seemed to bear this out. The white of three eggs was introduced into the stomach of a man, and the contents of the viscus withdrawn at the end of two hours. On one occasion he was forbidden to swallow saliva, and on another allowed to do so. It was found that in the first case the stomach still contained intact albumen as well as undigested starch, and the gastric juice yielded a very feeble peptonising power; whilst in the second digestion had been entirely effected. That this result is not due to an assumed increase in peptogenic substances in the blood by the conversion of starch into dextrin, but to the direct influence of the saliva, was shown by withholding starch in the above experiment, when it was shown that albumen was normally digested so long as saliva was suffered to pass into the stomach.

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DESPITE the incompleteness of the chain of evidence, there can be little doubt, says Mr. William Anderson, as to the infectivity of tetanus. It is certain that, although tetanus may be induced by the inoculation of a specific micro-organism or of a specific ptomaine, its occurrence as the result of direct transmission from one subject to another has yet to be demonstrated by clinical experience.

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THE motion of an earthquake is a prolonged series of twists and wriggles of a most complicated kind. These have been illustrated in stiff copper wire by Professor Sekiya. The models represent the absolute motion of the ground magnified 50 times. Small metal labels are attached to the wire to mark successive seconds of time from 0, where the shock began, to 72, where it virtually ended. These, the last product of Japanese ingenuity, may be purchased for a trifle.

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THE University of Harvard, Boston, Mass., was founded by one John of that name. His father carried on his business in Boar's Head Court, exactly opposite St. Mary Overies Church, London. In this house John Harvard was born; all of the family except three, one of which was John, perished in a few weeks during the plague of 1625. John's first visit to New England was probably in 1630, and again, and finally, in 1637.

# THE DENTAL RECORD.

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## ANOTHER PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

*(Continued from page 124.)*

SATURDAY, the last day of the Congress, was devoted to a very charming excursion to Mount Vernon, the invitations being issued by the Committee of the American Medical Association. Mount Vernon, which was the home and is now the tomb of George Washington, is situated about 17 miles below the city on the great Potomac River, and is the "Mecca" equally of the patriotic American and the intelligent foreigner. It is the universal custom to toll the steamboat bell on nearing or passing Washington's tomb;—a custom which is said to have had its origin in the reverence of a British officer, who, during the invasion of the American capital in 1814, as he sailed past Mount Vernon, had the bell of his ship tolled as a mark of respect for the dead hero. The Washington homestead is a wooden mansion of modest dimensions, and is mainly interesting from its large collection of Washington relics, not the least curious of which is the key of the Bastille, which was sent to the Father of his country as a gift from Lafayette, shortly after its destruction in 1789.

The trip was made in a Government vessel, starting from and returning to the well-kept grounds of the Government Arsenal. The general arrangements of this excursion were well organised and well executed, and, therefore, it was a complete success.

Before leaving Washington we took the opportunity of availing ourselves of the invitation of Dr. Billings, whose regretted absence at the Congress was the frequent topic of comment, to visit the Smithsonian Institution and National Museum, which are the most interesting of all the public structures in Washington. The beginning of this world-famous institution was the gift of an Englishman to America, and it contains an elaborate museum of natural history and anthropology. The National Museum is a more recent structure in connection with it, and under the same management. One of the

most interesting objects to Englishmen must be the first railway locomotive sent from England to the States. This locomotive, "John Bull," was built by Stephenson & Sons, Newcastle-upon-Tyne, in June, 1831, and after 40 years' service on the railway, has found a permanent resting place amongst the national heirlooms.

At 6.30 on the Saturday evening, the depôt of the Pennsylvania Railroad was a scene of wild confusion. We found two long trains, exclusively composed of Pullman Palace Sleeping Cars, drawn by two huge monsters, which contrasted strongly with our above-mentioned "John Bull," waiting to take the foreign visitors to the Congress on an excursion to Watkins Glen and Niagara Falls,—no doubt the biggest undertaking of its kind ever yet attempted at any of these international gatherings.

While in Washington, most of us had made it rather a point to avoid our immediate friends and fellow-countrymen, with the view of the better cultivating the society of American *confrères*; but now that we were together again, we looked forward to whiling away the long hours of the railway journey in the company of old friends. Such anticipations were in most cases rudely shattered, as most of us had taken our tickets in ignorance of the fact that by a little judicious planning a number of friends could secure contiguous sections in the same car. Our own immediate little party were more fortunate in getting together, and having as travelling companions old Cambridge medical friends, the French dental visitors, a Chinese medical practitioner, and last, but by no means least, Dr. Hickling, a Washington practitioner, one of the superintendents of the excursion.

Punctually at 6.45, as the stentorian cry of "All aboard," put mettle into the heels of all laggards on the platform, and amid the sonorous clanging of the locomotive bell, we waved a last farewell to the kind Washington friends who had come to witness our departure. In an hour or two the uncomfortable fact dawned upon most of our fellow-passengers that owing to the brief interval which elapsed between the end of the Mount Vernon Excursion and the beginning of this, that they had had no dinner. A sense of famine began to have a marked effect upon the company until it was pleasantly dissipated by the genial Dr. Hicks conveying us to the baggage car at the end of the train. Here we found an apparently inexhaustible supply of claret, lager and aerated waters, a huge cheese, a barrel of crackers, and another of pretzels, awaiting consumption. This railway picnic was indeed a funny sight. The presiding genius of this improvised

bar was an Americanised Frenchman of Jumbo-like proportions and geniality personified. The refecton was necessarily "rough and tumble," but it served its purpose. We wandered back to our respective cars inwardly invoking a blessing upon the Executive for their almost ultra-thoughtfulness in providing a liberal supply of cigars and cigarettes for consumption on the cars.

A long chat with our Chinese fellow-passenger and a couple of rubbers at whist in the smoking compartment of our car, constituted an agreeable evening, while discretion prompted early retirement to compensate for the irregularities of the previous nights.

As the itinerary of our special excursion announced that we were due in the town of Watkins, N.Y. State, some 320 miles from Washington, at 6 a.m., we were up and about extremely early. As a night like this in sleeping cars was a new "sensation" to many of our fellow-travellers, the narration of their various experiences formed an amusing accompaniment to a toilet performed under some difficulties. In the very early hours of the morning we had been more or less conscious of about an hour's rude and vigorous shunting to and fro, instead of the gentle swing and even rush onwards of the train; too lazy, too sleepy, too indifferent to enquire into the why and wherefore then, we ascertained in the morning that it was all owing to an unsuccessful effort to join the two long trains into a longer, and, as it proved, unwieldy one. The result was we were now running some three hours late.

As we had anticipated breakfasting between six and seven, our feelings towards the hour of eight baffle description, especially when after determining to make a matutinal descent on the baggage car, we found that, in the juggling of the cars during the night, the solace it might have afforded our craving stomachs had been transferred to the other train. Nor was this the sum of all our troubles. The, to us, almost tropical heat of Washington, had forced us to reduce our clothing to an external respectable minimum. Yesterday was full summer, to-day is bleak autumn—we had almost said, winter. My own experience was but identical with that of the major part of the foreign guests,—viz., a fearful cold and a bad attack of the so-called "Congress malaria." Fortunately my chum had his full equipment of baggage, and was thereby enabled to minister to the comfort of the chronicler, who had started with the small handbag as sufficing till the return to Washington on Tuesday. Soon after nine our respective trains steamed into the depôt at Watkins, when ensued a tremendous



rush upon the motley collection of vehicles which were ready to convey us to the various hotels at which we were to breakfast. It had been arranged that our large party should be billeted on the three principal hotels of the place, but on our arriving at the "Lake View" Hotel, as directed by the coupon in the book of tickets with which each traveller was provided, we found the large dining-saloon of that establishment filled to repletion, and enough people waiting to fill it again. If one had been in the humour to enjoy it, the scene in that hotel corridor must have been good enough for a play. The irate proprietor slanged the Committee, while certain of the Executive retaliated with force if not effect, and a surging but famishing crowd sought in vain the wherewithal to appease their appetites for a breakfast already three hours overdue. Some of us were so far oblivious of the surrounding turmoil that we eagerly seized upon this opportunity of consuming a dose of chlorodine from a phial carefully treasured by another suffering member of our party. We were fortunate enough to have been quartered in the same car as one of the principal members of the Executive Committee, who kindly turned up at this important juncture and spirited us off to another hotel in the lower part of the town, where those of us that were well enough indulged in a hearty breakfast.

In small groups of threes and fours, we occupied the next three or four hours in exploring the famous Watkins Glen. The glen is charmingly wooded and presents an endless variety of lofty waterfalls, charming cascades and whirling pools, surrounded on either side by rough and precipitous cliffs, now almost shutting daylight out, now opening up into wide and spacious reaches. The fantastic forms and disposition of the rocks and cliffs present an endless variety of charming pictures, wanting, however, on the day of our visit, the majestic touch of the sun to reveal the brightest glories of the glen; yet seated, on that cloudy Sunday morning, in perhaps the most charming part of the whole glen, we deemed it not inappropriate that a feeling of reverence was stirred within us by so charming a work of nature, and that the place should be known as the "Cathedral," with its truly spacious transept, its quaint pulpit rock and elegant choir. On emerging from the glen, the contrast between American and European enterprise was brought home in a practical way, and much to the disparagement of the latter. Our guide had anticipated finding a carriage there to convey us back by road, and as our time was short and no carriage visible, we were

feign to console ourselves with the knowledge that our guide was one of the leading members of the Executive, and the train could not well go without us. Presently we saw our guide emerging from a small wooden structure, a kind of refreshment saloon and bazaar, with the information that Mr. So-and-So in Watkins said that a carriage would be up in twenty minutes. In England, no establishment fifty times the size and importance of that little shanty would have been possessed of a telephone. After a pleasant drive, which afforded us an excellent view of Lake Seneca, and after dinner at the hotel, we hurried back to the train, which left soon after 3 p.m. on the second stage of our journey.

Watkins is situated at the lower part of Lake Seneca, and as the railroad follows closely the side of the Lake for almost its entire distance, we had the opportunities of enjoying its beauties under the most favourable circumstances. After a run of another 160 miles we arrived at a late hour at Niagara Falls.

Each passenger had in his book of coupons a ticket bearing the welcome device,

"GOOD FOR SUPPER AT NIAGARA FALLS.  
INTERNATIONAL HOTEL."

The sudden descent of a little army of some four hundred famished visitors evidently tried the resources of the service and of the kitchen of even this leviathan hotel. The dining-hall seemed capable of holding even half as many guests again, but the summer rush being over, the hotel manager had evidently thought that his reduced staff would be equal to this sudden increase of visitors. The temporary deficiency of both the food supply and attendance led to a few impatient outbursts of temper on the part of some of the visitors, who further played into the hands of the culpable party by leaving their supper coupons with the hotel clerk without having had any. One or two such outbursts were quite uncalled for, but the fatigue, the worry, and the change of temperature, had reduced almost half the party to a state of invalidism. A shortness of temper is surely somewhat excusable in him who suffers from a suffocating cold in the head and "Congress malaria." By the exercise of patience and good humour, the remaining healthy members of our party succeeded in making an excellent repast.

By this time I was, personally, in such a helpless condition, from the above ailments, that I was feign to avail myself of the professional services of our friend Dr. Hickling. In a neighbouring pharmacy he

concocted a sufficiently disagreeable mixture, the first draught of which, however, taken there and then, was rendered sufficiently palatable by the effervescing apparatus which is a necessary equipment of all good American drug stores. Despite the absence of the moon, and even the deficiency of star light, as well as the lateness of the hour, the constant "Thunder of Waters" in our ears attracted a solitary companion and myself to Prospect Park. Almost groping our way in the dark, we happily arrived at the little terrace overhanging the American Fall. The distant electric lights on the Canadian shore revealed but a glimpse of the rushing waters and the clouds of spray rising from the abyss below, yet adding distinctly to the weirdness of the scene. The first drops of what proved a heavy fall of rain curtailed our lingering at this fascinating spot, so we quickly returned to the sleeping cars, which had been shunted into a siding for the convenience of those who had been unable to obtain accommodation at the hotel, where an arrangement had been made for bedrooms on payment of the modest sum of fifty cents.

During the following day the International Hotel was the headquarters of our entire party, and it is but fair to add that the arrangements for the breakfast, lunch and dinner, with which each guest was provided, were much more satisfactory. Each visitor was also furnished with a long string of tickets admitting him to most of the places where toll is still levied, including the inclined railways, and also entitling him to a seat in a well-appointed carriage. Accordingly, the party broke up into little sets of threes and fours, to visit the various and manifold attractions of the place. On crawling down to the hotel to present my breakfast coupon, I felt too ill, and I entreated my friends to leave me behind, but luckily for me, in vain, as the unusual grandeur of the scene, the exercise, and the pleasant company proved the best of medicines. If there is one spot on earth calculated to make one forget oneself, that spot is Niagara; and I never felt so "mean" in all my life as I did that day, from being so painfully conscious of my own existence, and from being so envious of the robust healthiness of my companions.

I have no intention of attempting the difficult, if not impossible, task of describing the Falls of Niagara, nor the many other charms and wonders which delighted our eyes that day. Suffice it to say, that our carriage party were unanimous in the opinion that there must be something radically wrong with the man or woman who visits Niagara and comes away disappointed. We were also unani-

mous in voting our visit to view the Canadian Falls from below as not worth the trouble and bother, much less the dollar each which the Canadian harpies extracted from us in the name of their Government, for some quarter of an hour's use of a most dilapidated tarpaulin suit and leaky rubber shoes, and the almost unnecessary services of a guide. On the other hand, we voted the descent under the American Falls worth both the trouble and the money. This is a serious, and without a guide, a dangerous undertaking. For this expedition you have to remove all your clothing and don the oddly-fashioned garments furnished by the establishment. A friendly tip to the guide will enable you to enjoy a refreshing dip in a small division of the Lower Falls. This also affords an opportunity of gaining a slight practical knowledge of the enormous force of the falling waters.

Another trip, which should not be omitted, is a voyage on the tiny steamer, the *Maid of the Mist*, which boldly carries you up within what seems dangerous proximity to the mighty cataract on the Canadian side. At no time of that memorable day were we so conscious of the awful magnificence and grandeur of this unparalleled work of nature and the relative pettiness of man as when the little boat careened as if she would have toppled over into the seething waters, despite the adroit management of the man at the wheel.

Late in the afternoon a meeting was held in the parlours of the Hotel, when a series of resolutions expressing the warm appreciation of the very successful efforts of the Executive Committee in carrying out this last and most munificent entertainment for the foreign visitors was unanimously adopted.

At half-past nine, in company with a large number of others who preferred continuing their journey in other directions, and others like myself too ill to face the long return railway journey, we bade farewell to the remainder of the party, who returned to Washington, where they were timed to arrive at 3.15 on Tuesday afternoon.

Owing to the difficulties of so great an undertaking and the unforeseen repudiation of their engagements by the contractors, a certain amount of "friction" was apparent from time to time in the course of the excursion, but the wonder is that it was not greater. The members of the Washington Committee who accompanied us distinguished themselves by their urbanity under trying circumstances, and earned the heartfelt thanks of all who were fortunate enough to take part in this excursion, which may be best described by that favourite American phrase as being simply *immense*.

(To be continued.)



## THE FUTURE OF THE DENTAL ART IN FRANCE.

*Translated by* SIDNEY SPOKES, M.R.C.S., L.D.S.Edin.

A BOOK of 150 pages, with the above title, has recently been written by M. Decaudey, President of the General Association of French Dentists, the reading of which must prove interesting to those who have at heart the progress of the Science and Art of Dental Surgery in Great Britain. From the preface it appears that a Bill dealing with the practice of medicine was presented to the Chamber of Deputies in 1886, of which the 6th clause dealt especially with dentists, and, if carried, would restrict the practice of dentistry to legally qualified medical men. The following is a part of the first Chapter, and is an extract from the report of M. Gallard to the Standing Committee of Public Hygiene, followed by some of M. Decaudey's criticisms thereon :—

. . . . M. Gallard found the state of things brought about by these decrees grievous. He wished to modify it. He, himself, gives us the reasons for this wish. "The Commission, seeing that jurisprudence bestowed the liberty to extract teeth and adapt artificial dentures, has considered that, in the ordinary course of things, as that had been allowed, it would confer the right of preparing the mouth to receive these dentures ; as much in practising accessory or preliminary operations, such as incisions of the gums, opening an abscess, removing pieces of bone, and cauterisations, as in administering the necessary medicines to treat the different pathological conditions which can prevent or merely hinder the fixing of dentures. From the moment when all these practices can be left to the good pleasure of dentists ignorant of medical matters, to whom is left the right to freely extract teeth—which is often a surgical operation of extreme gravity—it is certain that public health is not sufficiently protected, and that an important branch of the healing art can be practised with impunity, in contempt of the provisions of the law, *l'an XL*, by persons not provided with a regular diploma. The public health is so little protected that those who practise the profession of dentist find themselves, by the act, authorised to use the most powerful caustics and most dangerous poisons in the dressing of diseased teeth, which there is no need to extract. It is thus that one sees them daily use chromic acid, tincture of iodine, arsenic, chloride of zinc, morphine, and the chloride of mercury or corrosive sublimate, &c.

So, then, there is only one way to get rid of the abuses which have just been enumerated: it is by asking from Parliament a legislative order, new or supplemental, which, filling the gap left in the law, *l'an XL*, obliges those who give themselves up to the treatment of the mouth and teeth to be provided with a diploma, like those who give themselves up to the practice of the other branches of medicine. Here arises the question, as to whether one ought to impose upon dentists a special diploma, or to demand from them the same curriculum or examination as for the other doctors. The solution of this question is not doubtful for the Commission. It thinks that general medical knowledge is indispensable to whomsoever wishes to give himself up to the practice of one branch, however limited it may be, of the art of healing. And, while approving the actual tendency of specialising practice as far as possible, it must remark that specialisation can only constitute a real progress with the sole condition of having for its basis and point of departure a sound and extended general knowledge. That is so true, that the real advancements made in the practice of the dental art—and they are many—for a certain number of years have all been realised by doctor dentists.

We cannot, then, while having a learned and esteemed doctor of medicine, disdain the profession of dentist, and society has a right, a duty even, to demand that all those who wish to practise this profession should be, in default of a doctor's diploma, provided at least with that of *officier de santé*.

It goes without saying that this obligation can only be imposed upon those who, in their practice, give themselves up to a medical or surgical action upon the mouth of which the extraction of teeth forms part. As to those who limit themselves to the construction of artificial apparatus they are not dentists, properly speaking, but mechanics or mere artisans, to whom perfect freedom could be left with the certainty that they would not abuse it, for their trade could only be carried on usefully under the direction of a medical dentist.

It is, however, this mechanical part of dental practice which has always complicated the question by showing to the public the dentist as an individual apart, whose profession can be regarded as altogether independent of the medical profession. As on one side are found those in favour of perfect freedom, which has led to the decrees of the Court of Appeal, so there are found others in favour of a greater restriction than that proposed by the Commission. These

last demand the creation of a special diploma of medical dentist, as that has been adopted in several neighbouring countries to our own. To this proposition, which has been upheld and unravelled even in the Commission itself, a first principal objection can be made ; it is that to a too great licence would succeed an excessive restriction, since a doctor of medicine, able to treat all the diseases of the human body and to perform every imaginable operation, would no longer have the right to extract a tooth or incise a gum without submitting to a supplemental examination, which would give him the special diploma of dentist. That is inadmissible, but, it is added, the general knowledge of a doctor does not oblige him to acquire the manual dexterity which he needs to practise the art of dentistry, and it leaves him more often quite ignorant of special ideas which will later on be indispensable for him to practise this profession. This is strictly true. But is it not the same for all other specialities ? And if a special diploma is created for diseases of the mouth and teeth, why not for the diseases of the eyes, ears, stomach, heart, for diseases of the urinary organs, and particularly for the use of the lithotrite and for mental diseases.

It will be right that the law to come into force, which would have for its end the prohibiting of the practice of dental medicine and surgery to whoever had not the legal right of practising medicine in France, should respect, in a certain measure, positions of actual liberty, acquired under the Empire, and accord facilities or delays to established dentists to allow them to acquire the university title which they need. The Commission has thought that the only rights which ought to be considered as seriously acquired are those existing by certain conditions of age and length of practice, which they propose to fix in the following manner : Those only who at the passing of the Act should be thirty-five years of age and of five years' standing, proved by a legal patent, would be allowed to continue the practice of their profession for a certain period, say seventeen years, without being obliged to provide themselves before this delay with the diploma of doctor of medicine or *officier de santé* ; all those who did not fulfil the conditions of age and length of practice would be obliged at once and without delay to put themselves in the way of obtaining one of these diplomas, for which purpose licenses of registration or of residence could be given them at their request, addressed to the Minister of Public Instruction.

Among the number of privileges which dentists have thought

they ought to assume, in consequence of the too great liberty which has been allowed them by a wrong construction of law in the *Court de Cassation*, we see the employment of anæsthetics figuring daily. And it is the accidents occurring during anæsthesia which have, above all, attracted the attention of the Government, and led them to contemplate interfering, in order to regulate the practice of the dental art. But from the point of view of a correct interpretation of the law, the question of administering anæsthetics cannot arise; for when they are administered with the idea of avoiding the pain arising from tooth extraction, it is not sufficient to consider anæsthesia as a simple preparatory act of this extraction, for anæsthesia of itself is a medical act of the highest gravity. Not only does it require at the commencement such care that the most skilful surgeons never use it without assistants, frequently numerous and always experienced; but, more, it is absolutely forbidden to employ it in certain conditions of health which might render it fatally dangerous. It is then impossible to admit that a person unacquainted with medicine can be authorised to use it.

1. The practice of the dental profession ought to be forbidden to everyone not possessed of the diploma of doctor of medicine or *officier de santé*.

2. With regard to acquired positions, the right of practising the dental profession could be continued to every dentist over 35 years of age who proved, by producing his patent, that he had been five years in practice at the proclamation of the law.

3. Nevertheless, the indulgence recorded in the preceding article will in no case give these dentists the right of administering anæsthetics—a right reserved exclusively to those who have satisfied the requirements of the law 19 *ventôse l'an XI*.

In the first part of this Report, with regard to the established law, everything is clear; we know what courts have given judgment, and upon what considerations they have been supported. In that part which we have reproduced everything is sentimental and cloudy. "Public health," we read, "is not sufficiently protected, and an important branch of the healing art can be practised with impunity, in contempt of the directions of the law of *l'an XI*, by persons not possessed of a regular diploma." The reporter went about his work with remarkable boldness. Now, who is able to say that a French law, even that of *l'an XI*, is broken by a person or a class of persons? The law courts, and they alone. Now, the Court



of Appeal, the Court of Limoges, and the Court of Amiens have formally declared that the dentist without a diploma practising his art does not violate any of the arrangements of the law *de ventôse*.

By what right does M. the Reporter, substituting his opinion for that of the Courts, speak of contempt for this law? It was disrespectful towards judicial authority—disrespect the more inexcusable when it is found in an official statement.

They talk of opening an abscess, incisions of the gums, removing portions of bone and of cauterisations. These heaped-up expressions make a good show in a paragraph; they are able to make timid people reflect, to warm up their zeal again for the public health. Yet there is a difference between a simple statement and an extended application of it. We open an abscess of the iliac fossa and the abscess which surrounds the core of a boil; we make incisions of only a millimetre or of several centimetres; we use the red iron for a cancerous cervix or nitrate of silver for warts—it is still a cauterisation. The importance shows an endless variety; the great question is to know if the operations undertaken by dentists are serious, and nothing is said about it. I was very sorry that M. Gallard, who was a patient of mine, with whom I always had the most cordial relations, never asked me what I should do in affections of the mouth requiring scraping the bone, great incisions and extended cauterisations. I would have given him my prescription, which is that of all my brethren. Finding it excellent, he would have certainly lightened his report of the reflections I have quoted. What do I do? I send sick people to the surgeons.

Since the occasion offers I will say, so as not to come back to it again, what I think of the theory upon which the Bill rests.

The dentist, it is said, is a specialist like any other. No; he is not at all like another specialist. The comparison is radically false. He only treats the teeth; his excursions in their neighbourhood only represent the chances of his practice. In order to make the comparison hold good, you must compare the buccal cavity with the orbital cavity for instance. The oculist does all the operations which are performed upon the eye and its surroundings; the extraction of cataract, strabotomy, enucleation and the extirpation of malignant tumours of the orbit; the corresponding specialist ought to remove the tongue and perform staphylorrhaphy and resection of the jaws. He would no longer be a dentist, but a stomatist. This immoderate extension of an art, to which tradition and custom have

assigned more restricted limits, will unhappily end in trouble and decline for that part which interests us.

The qualifications are different for the surgeon accustomed to great wounds, to immediate decisions, to sacrificing portions of suspected tissue, and the qualifications of the dentist work in his favour—a conservative before everything, guided in most cases by æsthetic considerations. His surgical domain is narrower than one can tell; he does not even understand all the operations described in manuals of minor surgery and so often left to nurses.

But let us go back to our Report. "The public health is so little protected that those who practise the profession of dentist find themselves, by the Act, authorised to use the most powerful caustics and most dangerous poisons for the dressing of diseased teeth which there is no need to extract. It is in this way that we see them daily using chromic acid, tincture of iodine, chloride of zinc, arsenic, morphine and the chloride of mercury or corrosive sublimate, &c."

These lines and the others which speak of the use of anæsthetics are the only plausible reasons suggesting restrictive measures.

Poisonous matters, of which the name alone makes the honourable reporter tremble, are used in a hundred industries under more dangerous circumstances. Water of Bourboule is sold, of which every litre contains more arsenic than a practitioner uses in several dressings; dwelling places are painted stone colour with white lead, walls are re-covered with papers coloured with suspicious matters. A possibility is an abstract idea—it is neither good nor bad. In order for a legislator to prevent an evil, he must be able to put his finger upon it. How many cases of poisoning have you collected following dental treatment? If the number is insignificant, you have no right to avail yourself of accidents which are not often attributable either to awkwardness or ignorance, which are misfortunes which happen even to the best informed practitioners. There are, every year, in French towns a considerable number of cases of brain disturbance, of fractures of the skull, caused by the fall of tiles and chimneys. Since people's safety possesses you up to the point of a possibility, you would legalise forbidding the dental art to those who do not possess the medical diploma, you should follow the analogy, and place the obligation of the same diploma upon slaters and chimney doctors, whose awkwardness and carelessness may be followed by a man's death.

I come to anæsthetics; the argument was in 1886 really actually

valid, because a much-talked of case was tried a short time before in the Court of Correction de la Seine. It is still a point upon which a very great deal has been written without placing the question upon its proper footing. I have no hesitation in saying that, with regard to this, some of the considerations formulated by M. Gallard are just.

General anæsthesia, as brought about by nitrous oxide or chloroform, has dangers, dangers which are increased by inexperience of the operator and the absence of medical knowledge. No one has deplored more than I the kind of temerity as a consequence of which general anæsthesia has become, instead of an exceptional practice, as it ought to be, a necessary accessory in certain surgeries. Carried out without preliminary examinations of the thoracic organs, without precautions, without foresight of accidents, and without means of overcoming them, it is a serious imprudence. With a diploma or not, he who undertakes it under these conditions is blameable. But justice does not allow anyone to go free; the Courts have never admitted irresponsibility in the medical man: they will never admit it in the dentist. It is for them and not the statesman to protect the public. If they strike the unskilful with vigour, if they hold to account, in the application of the law, the oversight of the practitioner who undertakes anæsthesia without having done what is necessary to assure himself that it has every reason to be innocuous, offenders of this sort will be so few that a proposal for preventing them would be superfluous.

In twenty years' time people will no longer understand the feeling excited to-day by nitrous oxide. The discovery of cocaine has so restricted its use in dental art that it is possible to foresee the time when it will disappear from practice. In that day all difficulties will be smoothed without the code being burdened with a paragraph.

Clause 6 is badly supported. The ministers have taken the advice of the Standing Committee of Hygiene. The Standing Committee of Hygiene have desired M. Gallard to make a report. M. Gallard has made a report based upon hypothetical considerations void of facts. It is impossible that such a document should serve as matter for discussion in the Chambers.

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**THE ODONTOLOGICAL SOCIETY.**

THE ordinary monthly meeting of this Society was held on the 5th ult., at 40, Leicester Square, London, the PRESIDENT, Mr. Daniel Corbett, M.R.C.S., L.D.S.Eng., in the chair.

Mr. FREDERICK EVE, F.R.C.S. (Curator of the R.C.S.Eng.), read a paper on "Actino-mycosis of the Jaw." He said that he acceded with very much pleasure to the request of the Secretary to read a paper before the Society. The subject he proposed to bring under their notice was one which had hitherto received little or no attention. The love of novelty was perhaps as strong in the present day as it was in the days of the Athenians, and applied as much perhaps to science as to fashion; were it otherwise, the life of the scientist would be a dull one. Fresh fields for thought were continually being opened up by observation and research, new diseases were being discovered, and old diseases were constantly gaining fresh aspects from frequent investigations. In these days of rapid advance, the persistent reiteration of already discovered truths and the frequent tilling of the same area of knowledge had not the same value that it had in former generations. A satirical allegory from the German pictured Death as soaring over the world armed with a scythe. On one wing pestilence, disease, and famine were depicted; and on the other was the medical student making a vow that he would always exercise his profession without alteration. Now, it was unnecessary to say that in the present day their energies were devoted to the advancement of their profession. Analysis, under imperfect knowledge of the subject formerly often grouped peculiarities of different diseases together as one, whereas now each would be regarded as a pathological entity, and subsequent analysis showed this to be the case. Actino-mycosis was originally regarded as a tumour, and from the fact that on squeezing the tumour the exudation had somewhat the appearance of a thread worm, Veterinary Surgeons gave it the name of the "worm." One of the specimens before them was described as micro-sarcoma, and afterwards as a scrofulous and tubercular tumour.

Actino-mycosis was an infective disease, the infecting quality depending on the presence of a fungus—of a tubercular formation and granulation tissue. When once a primary tumour had established itself in the jaw, secondary tumours might arise by means of portions of the fungus being carried to different parts of the system through the medium of the blood.



The jaws and mouth being that part of the human anatomy in which the Society was most interested, he would endeavour to illustrate the disease as it occurred in those localities, and fortunately he was enabled to do so with the aid of the very excellent collection of specimens belonging to the museum of the Royal College of Surgeons. The first specimen was the lower jaw of an ox, which showed the ordinary course of the disease.

In the second case a section had been made, and it showed the jaw as widely infiltrated by a cellular growth. This growth was penetrated with a number of small apertures. The next specimen was that of an upper jaw, the antrum being filled with a tumour formation, the growth projecting as a prominent mass over the face. There were also two specimens of the human subject; they had, however, been so long in the museum that the macerating effects of the spirit in which they were preserved had considerably altered their original appearance, but he had no doubt that they were both cases of actino-mycosis. The disease also attacked the tongue, and he was able to show them an excellent specimen of it in this location. The organ was very much enlarged and elongated. Prior to the disease being named, this condition was known and described as a "wooden tongue." It would be observed that this specimen (the tongue of an ox) was dotted over with a number of points, small nodules varying from the very minute to the size of a pea. Then, again, the disease occurred in the organs of nutrition. An example of this was seen in the section of liver before them. The nodules in this instance were characterised by a number of perforations, giving them a honeycomb-like structure. This case was so interesting that he might detain them for a few moments with a description of the details. In 1881 he made a *post-mortem* examination of a lad and found that he had tubercular disease of the kidneys. On making a microscopic analysis he found what was to all appearances a tubercle. Some time afterwards, having studied the disease which was the subject of his paper, he went back to this specimen and became convinced, on again cutting sections, that this was a case of actino-mycosis, by the presence of actino-mycetes. There could be little doubt that in the present day they were constantly overlooking cases. The peculiarity of the fungus was the actinomycis, as it was called. It was seen as a rounded body having a radiated appearance. These bodies varied in size from a grain of sand to that of a millet seed. On making sections, such as seen in the diagrams,

it would be found that they tapered up into a number of rounded areas, surrounded by a zone of leucocytes. A careful study of the actino-mycetes would show that it was composed of leucocytes which surrounded the centre, and radiating from it were the club-shaped processes. It had the appearance of a composite flower, such as, for instance, the China aster. In some instances one might trace the filament of their threads i. to the central mass.

The distribution of the disease was especially interesting. Of 75 cases quoted, in the human subject, 49 cases occurred in the jaws, the face or the neck. The clinical appearances were most various. In the case of the jaw it generally commenced in a severe pain in a tooth. This was followed by a swelling in the neighbourhood of the tooth, and suppuration intervened. When the disease occurred in the neck, it might take the form of acute abscess. The abscess might form behind the pharynx and travel along the whole length of the spine. In the liver the abscess might point through the walls of the diaphragm and burst into the chest.

With reference to the communication of the disease, portions of a tumour might be removed from one animal and another animal be inoculated with it. It might be communicated from cattle to cattle, but not from cattle to human beings. When animals were inoculated, secondary growths were produced. The number of kinds of animals susceptible to the disease appeared to be somewhat limited. Rabbits and dogs were not susceptible to it. It had been stated that the disease had been cultivated on blood serum. Israel and Bortrum, however, were unable to reproduce the disease in cattle on inoculating his cultivations. The botanical position of this peculiar fungus had not been ascertained.

Very little was known as to how the disease passed into the human body; it had been found in the region of the chest on the removal of the breast; it had been found in connection with abrasions of the tongue, caused by the friction of carious teeth. The tumour had also gained access to the jaw as the result of carious teeth. Other observations to the same effect had also been recorded of the disease occurring in the lungs; it was probable that the mucous membrane was infected. Similarly, when the tumours were found growing in the mouth, the mucous membrane was wounded by particles of hard food. So far, the evidence that man was inoculated with the disease from animals was unsupported.

As regarded treatment, the same principles held good as in the

cases of ordinary tumour formations. If the disease covered a limited area, the whole of the diseased structure should be excised. If too large an area were occupied to admit of this, the part should be eradicated with a sharp instrument. Complete removal of the disease prevented its recurrence. It was a curious fact, that while up to 1886 75 cases had occurred on the Continent, only seven cases had occurred in England and America. Whether the disease was really more common on the Continent than in the other two countries named, or whether the comparatively few cases recorded in those countries was due to greater ignorance concerning the disease, was not quite clear, but Mr. Eve thought that the difference was probably to be accounted for by want of information, and that the disease had passed unrecognised in consequence.

As diseases of the jaws lay specially within the province of the members of the dental profession, they would have larger opportunities of observing morbid conditions of the jaws and teeth than would occur to medical men outside that specialty; and if those whom he was addressing would be on the alert in their daily practice for indications of the disease under consideration, and would communicate the circumstances of any they discovered to him, he should be very happy to throw any further light upon the subject within his power. It was hardly necessary for him to say that there was one important point for them to work out, viz., the relation of this disease to carious teeth. If he had not already transgressed too long on the time of the Society, he would offer a few remarks on the relation of micro-organisms to the disease. It had been said that in the healthy human mouth there might be fifty different micro-organisms. It was not necessary to remind them that the disease of dental caries had been found connected with the growth of micro-organisms; and he believed the latest theory with regard to caries was that the dental tissue became decalcified, after which any form of micro-organisms might assist in breaking up the dental tissue. A form of micrococcus had been developed for the healthy secretions of the human mouth which, when injected into a rabbit, produced septicæmia. The mouth had been compared to a hot-bed, containing myriads of micro-organisms, and yet it was a known fact that wounds of the tongue and fractures of the jaws were rarely followed by complications. The case of fractures of the jaws was the more remarkable, as antiseptics could not be used. How different was the result of compound fractures of the jaws and compound fractures of

femur treated as an open wound. Again, in the case of periodontal abscess, although the pus directly gained access to the bone, serious consequences rarely followed.

In a case which came under his own notice, the patient, a young man aged twenty, was in the first instance troubled with an abscess in the region of the fangs of a second molar tooth. He attended the funeral of his grandfather, caught cold in the tooth, and died in three weeks of pyæmia. How was it that these cases were not more common? It was known that vascularity and salivary secretions checked the growth of micro-organisms. In the case of animals there was no doubt of the healing property of saliva and that wounds were cured by it; indeed the fact was supported by Holy Writ in the story of the dogs licking the sores of the beggar lying at the gate of Dives. There could be no doubt, however, that many of the affections of the mouths of children were directly due to the presence of micro-organisms. He had observed cases which appeared to show that chronic soreness of the mouth was set up by these micro-organisms. He had in his mind a case in point, in which a man had been under treatment for chronic ulceration of the mouth. Various specifics were tried for a long time without any effect whatever. Mr. Eve observed that the man had several carious stumps, and that the gums were retracted from the teeth; the tongue was covered with an exceedingly foul fur. Under his (Mr. Eve's) advice the patient had the stumps removed and antiseptics were administered. In a few weeks the mouth regained its normal healthy condition. In the case of cancer, too, there could be no doubt that the irritation of the tongue by jagged teeth was a promoting cause. He thought also that putrefaction going on in the teeth was strongly accessory to the disease.

In conclusion, he would like to mention the presence of phosphate calculi in the bladder, and drew from it the inference that the formation of tartar was directly due to the changes in the mouth, owing to the growth of micro-organisms. The facts which he had enumerated showed, he thought, that quite as much attention should be paid to cleanliness as to anything else.

The PRESIDENT, in inviting discussion, remarked that they were greatly indebted to Mr. Eve for his very interesting paper, and for the lucid and instructive manner in which he had handled the subject.



Mr. CHARTERS WHITE felt sure that the valuable information which Mr. Eve had given them would induce many to give their serious attention to the subject, with the view of throwing more light upon it.

Mr. WALTER H. COFFIN had lately been informed that diseases of the jaw were greatly on the increase in the Western States of America. There being very few "vets." in that part of the world, very little, if anything, was known as to the nature of these diseases. It was no doubt highly probable, from what they had heard from Mr. Eve, that these were cases of actino-mycosis. He should mention that there was a greater tendency to these growths in hard winters.

Mr. J. SMITH TURNER said that he had not the pleasure of hearing the first part of Mr. Eve's paper, but it appeared to him, in listening to the latter part, that Mr. Eve had entered somewhat debateable ground when he pointed to cancer of the tongue being caused by ragged teeth. That, he was aware, was a not uncommon assertion, but he had not found it in observation. He had seen many diseases of the tongue where it had been necessary to remove teeth; but it seemed to him that, although a ragged tooth might be a local exciting cause, the seat of the mischief must be sought elsewhere. There were many cases of cancer without ragged teeth; he had seen as many cases where the teeth were sound as he had where they were unsound or jagged. Mr. Eve's solution of the presence of tartar he also considered somewhat remarkable, because, in a large number of mouths, there was a total absence of deposits. If tartar was due to the cause Mr. Eve assigned to it, he (Mr. Turner) was unable to understand why there should be so many exceptions. Again, he thought it would be necessary to look somewhere else, more especially as this tartar accumulated only in certain positions in the mouth. He concluded by saying he thought the Society was very much indebted to Mr. Eve for the able and careful manner in which he brought the matter before it.

Mr. STORER BENNETT asked if Mr. Eve would say whether it was a difficult matter to prepare microscopic specimens of actino-mycosis. As the success or failure of their specimens would doubtless depend on the adoption of a correct method of preparation, and as Mr. Eve had invited them to prepare specimens, they would be very much obliged to him for any instructions or hints he could give them. In the early part of the paper, Mr. Eve had said that the disease was capable of being conveyed from one animal to another. He (Mr. Storer

Bennett) would like to know if an animal already infected could be inoculated in any other part of the body; as could be done, for instance, in the case of syphilis? One other question he would like to ask. Mr. Eve, in his paper, had mentioned a case in which club-shaped bodies had been detected in the human subject. As there were so many cases of alveolar abscess and carious teeth, it would be interesting to have some idea of the length of time the micrococci would take before the system could be in any way infected.

The PRESIDENT would ask only one question. Had Mr. Eve any experience of prophylactic treatment? It seemed to him (the President) that it would be more desirable to attack the disease *in situ*.

Mr. EVE, in reply, expressed his gratification at the interest shown in his paper. In the first place, he would answer the President's question. In the case of a primary tumour, it could be excised. It had also been proposed, in those cases that could not be dealt with surgically, to give large doses of perchloride of mercury, in the hope that the fungus might thereby be destroyed. Mr. Coffin had remarked upon the frequency of disease of the jaw in cattle in America. He (Mr. Eve) was of opinion that it was much more likely to be actino-mycosis than anything else. One of the members of the Society had commented on the causation of cancer. When he (Mr. Eve) spoke of cancer being related to carious teeth, he did so only as an *exciting* cause. Caries was so frequently associated with cancer that he thought that some condition of chronic inflammation was a predisposing cause. He mentioned the question of tartar in the hope that someone would have been able to tell him more about the subject than he at present knew. He had consulted some of the authorities which he expected would throw some light on the formation of tartar, but had not been fortunate in finding the subject fully grappled with. Unless the disease were produced by the putrefactive action of micro-organisms, to what could it be ascribed? He could quite conceive that tartar might exhibit itself in different forms, each form being due to different organisms. With regard to the preparation of microscopic specimens, if sections of the disease were cut and treated in the ordinary way, the fungus would fall out, so that it was necessary in the first place to imbed the section in cocoa butter. There were many ways of staining; he thought the best was fuchsin, a red aniline dye. He was not aware that any experiments had been tried with regard to anti-inoculation. He was of opinion that the

disease was a purely local one, and hardly thought that the occurrence of it protected it from further attack. Very little was known as to how the fungus got into the body. Mr. Eve concluded with a description of the diagrams on the walls illustrating the disease.

The PRESIDENT then delivered his

#### INAUGURAL ADDRESS.

Having acknowledged the honour conferred upon him by his elevation to the Presidential Chair, he referred with satisfaction to the movement for the improvement of the status and education of the profession which had been initiated by Sir John Tomes and his co-workers; a movement which had already been fruitful of such good results, and to which he could say, with some gratification, he had given his unremitting support.

He proposed to select as the main subject of his address the question of "Diet," in relation to the growth and development of the teeth. It had been the frequent theme of essay and discussion, and to a certain extent the subject had been treated from the exact scientific standpoint. Whilst most of the questions that were likely to arise in connection with their limited specialty had been investigated very fully and exhaustively, there remained, in his opinion, much to be done by the microscopist and the chemical analyst in the matter of the influence of diet on the teeth. While they had made advances in every department of operative and mechanical resource, he thought they had done very little to arrest the lamentable deterioration of the teeth—to make them stronger, to arrest the invasion of caries, to improve and condense their texture, to augment their reparative qualities.

It would be convenient to consider three periods during which the influence of "Diet" was acting on the development, growth and health of the teeth:

1st.—On the *foetus in utero*.

2nd.—On the child and youth until the third molars were fully erupted.

3rd.—On the adult during the rest of life.

Corresponding to these periods food might be regarded in three different aspects:

1st.—The food taken by the mother during pregnancy.

2nd.—The food of the child or youth or adult, as a direct nutritive agent to the tooth substance.

3rd.—The food of the child, youth or adult, regarded as a deleterious agent, either by deranging the stomach or by acting directly on the teeth by a chemical or mechanical process.

Dr. Robert Blake, of Dublin, stated that "on examining the jaws of a fetus about the fourth month after conception, I observed the rudiments of vascular membranes of twelve teeth in each jaw." It might be assumed, therefore, that at this or even an earlier period of gestation, the germs of teeth were receiving an impress which they would bear ever after. At the period of birth the germs of the deciduous teeth had attained pretty nearly the full size that the crowns of these teeth would assume at the time of eruption, and all those germs were more or less calcified. To the period of eruption of the teeth one invariable law applied,—viz., that from the moment of their eruption into the oral cavity the enamel underwent no change save the destructive one.

Mr. Corbett was disposed to regard luxurious living as the cause of the greater delicacy of teeth which he had invariably found in the upper and middle classes than in the lower.

Every mother should bear in mind the conditions essential to the development of the child's teeth. (1.) That the germs of the teeth should be well formed, whether brought in through the blood vessels of the mother, or after birth, through the arteries of the child. (2.) That the chemical elements necessary for tooth calcification should be contained in the food of the mother during pregnancy and lactation, and subsequently should be present in the food of the child. (3.) That the elements should be present in the food in such combination as to be readily capable of assimilation. He thought that much practical advantage was to be gained by exhaustive and accurate analyses of the foods and teeth of different races, and also of the richer and poorer classes of the same country.

The strongest teeth were to be found in the Hindoo, whose principal food was rice. The Scotch and Irish peasantry, also, had very strong teeth, the staple food of the former being oatmeal, and of the latter potatoes.

The most beautiful teeth were found in the aristocracy, who eat animal food in large quantities; but caries was much more common in this class than in those previously mentioned. As an Irishman and a dentist, Mr. Corbett viewed with alarm the large substitution in the food of the Irish peasantry of Indian meal, which was poor, for the potato, which was rich, in lime-salts. This substitute might



possibly account, to some extent, for the increase of rickets in some of the larger towns. He was disposed to rely more on a judicious scale of diet for chemicalising the blood of the mother or growing child than in the administration of drugs; though these latter might be of very essential service in invigorating and stimulating the organs of assimilation. Having regard to the large quantity of phosphate of lime in casein contained in the oatmeal and whole-meal breads, he hardly thought they could be improved upon as agents for supplying the blood with the proper lime-salts in a readily assimilable form. He did not propose to dogmatise on the exact period of life during which the teeth were capable of being nourished by the food. There were many indications that the dentine and tooth pulp were susceptible of vital action up to a late period of life, and it was quite possible that this vital action might have a large share, not only in building up a rampart against decay within the pulp cavity, which was admitted by all, but also in keeping strong the natural outwork of dentine, and maintaining a condition in the barrier capable of preventing or retarding the advance of caries.

Mr. Corbett then dwelt upon the responsibility resting upon the medical attendant as to the proper development of the teeth of the child during its intra-uterine life, and its early years of childhood. He regretted to say that he did not think all medical men paid sufficient heed to this grave matter. Too often the parents had the idea that, as the temporary teeth were to be replaced by others, there was no use in attending to the dentistry of the child in early life. For this ignorance the medical attendant could not be acquitted of blame. If he were as well acquainted with the physiology and pathology of the teeth as he was assumed to be of the other portions of the human frame, this state of things could not exist. Medical men should be encouraged to come to the Dental Hospitals to study accurately these matters, as they did affections of the eye and ear. There had been a good deal of mistrust, jealousy, and ill-feeling; but he hoped and believed that that was giving way to the mutual respect of the doctor and the dentist, through whose combined efforts he looked for the better education of the public on these important matters.

The dental profession might describe and define in the most accurate way the proper system of therapeutics, but the doctor was the agent by which a large part of this system was to be carried out.

He firmly believed that, with the aid of a proper therapeutics, the improvement of the teeth could be made as marked in the future as their deterioration had been in the past.

In conclusion, Mr. Corbett urged the necessity of including popular physiology in the scholastic curriculum of girls, so that as mothers they might more fully realise their duties and responsibilities.

At the conclusion of the address, Mr. THOMAS ARNOLD ROGERS said that, as senior member of the Society, the pleasant duty devolved upon him of thanking the President for his able address. They would all feel that Mr. Corbett was doubly welcome among them, first on account of the zealous manner in which he had sustained the status of the profession, secondly, because he came as the representative of the sister isle, for which they all felt so much sympathy and affection.

The vote having been carried by acclamation, the PRESIDENT briefly thanked the Society, and the meeting adjourned until April 9th.

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### ODONTO-CHIRURGICAL SOCIETY.

THE Fourth Ordinary Meeting of the Session, 1887-8, was held in the rooms of the Society, Chambers Street, Edinburgh, on the 9th of February, W. H. WILLIAMSON, M.D. (President), in the chair.

Mr. STIRLING, L.D.S.Eng. (Ayr), read a paper on—

SOFT TEETH IN CHILDREN—HOW FAR WE ARE JUSTIFIED IN ATTEMPTING TO SAVE THEM?

In considering this matter, it does not seem to me to be so much a question of deftness of hand and skill in operating as it does one of good sound judgment, though I confess I have sometimes been very undecided as to what to do, or what *not* to do, yet I am satisfied that a great many children's teeth have been stopped which should not have been stopped, and that the operation was not only useless, but worse than useless.

To begin with the temporary teeth (of which I shall have only a few words to say), we usually find it difficult to stop teeth for such young patients as are under seven years of age. The flow of saliva and restlessness of the patient, together with his inability to endure the pain caused in removing the decay, make it in most cases impossible to insert proper stoppings. Many cases there are where it may

be advisable and important to save the temporary teeth ; but our subject is *soft* teeth. Then, if we insert into soft teeth stoppings which are not proper stoppings, they can only partially arrest the decay, and only for a very short time. Now, if that is so, are we doing right in filling these teeth at all when we are asked to do so? I think we do better when we advise their being left to decay, and then extract, when necessary, for toothache. Three weeks ago I removed all the upper teeth and the four lower molars from a child of three years old. The front teeth were only stumps, and the molars were extensively decayed. I do not believe that any harm will result from the early loss of the molars and of the temporary teeth ; these are most prone to give toothache.

Now, with regard to the permanent teeth, I see a great many cases of rapid decay in the teeth of children where, from the age of the patient and the poor structure of the teeth, we can only but imperfectly and inefficiently stop that decay, and I have long since observed that there are a certain number of cases entirely beyond the power of our art to deal with successfully. We sometimes have brought to us children under twelve years of age whose teeth are carious and soft, and so sensitive and painful to the touch of an instrument that it is a great strain on the nerves of both patient and operator to attempt the insertion of good stoppings—teeth, upon which we could spend a great deal of time in putting them right, which would probably require attention again in the early future, and which, after all our stopping and restopping, would result only in partial success. For instance, a child of nine or ten years old is brought to us with the six-year-old molars decayed, not as yet very extensively, but all apparently soft teeth, also interstitial decay in the front teeth. We stop them. Some time afterwards some of the molars require another stopping, and we see the bicuspidis now fully erupted, some of them likely to require attention by-and-bye ; in another year some of our first stoppings are giving way ; we restop these teeth, and that goes on at shorter or longer intervals for five or six years, till the patient has reached the age of eighteen years, when probably the teeth will be getting harder and the saliva less acrid, and then we have good hope of saving permanently what we have left. But what have we left? We have left, in many cases, a number of unsightly and not very useful teeth, some of them perhaps causing occasional discomfort to the patient, and, to say nothing of time and expense, how much has the patient suffered? How much has the

operator been worried with sensitive teeth before arriving at this result? If we have gained a good set of teeth, we are repaid for all our labour, but if we have only an imperfect set—if some of the teeth have been lost in spite of our endeavours to save them, and those that are left are, many of them, not teeth, but halves of teeth, the other halves being made up of stopping—then, I ask, have we been doing a good thing for the patient in trying to save them at all? We may expect that, soon after reaching manhood, our patient will be requiring artificial teeth.

I think you will agree with me that it is not unusual for us to have to extract all the upper teeth from a young lady not over eighteen years of age. A few months ago I extracted all the teeth (twenty-eight) from a boy only fourteen years old. The patient being a boy, made it more unusual. They were all stumps, with the exception of the lower front teeth, which had parts of the crowns remaining. I feel sure that any attempt to save that boy's teeth, however good the patient and proficient the operator, must have resulted in failure. It is the belief that too often such teeth *are* stopped that leads me to ask if, in attempting to save such teeth, we are doing any good for the reputation of our profession, or would we be likely to increase the confidence which the public reposes in the potency and usefulness of our art? Would we not rather be creating a poor opinion in the minds of our patients as to the real value of stopping teeth?

When children with soft teeth are brought to us to have their teeth attended to, I think we ought to pause for a moment and consider before we begin how the case is likely to go on in the future; and we should not undertake any case lightly or unthinkingly, and give it our serious consideration only after part of the work has been done. You may advocate conservative dentistry, but if that means stopping any tooth you are asked to stop, or that you find decayed, simply because it is not too much decayed to be stopped, then I think that is carrying conservative dentistry to extremes.

To arrive, then, at a proper understanding of a case, we should begin by carefully examining all the teeth as to the extent of the decay, their degree of softness, their colour or opacity, their degree of sensitiveness to the touch of an instrument, and also find out the character of your patient, as much depends on that. Some children will sit still and bear pain bravely, while others will not even try to do so. Consider also the health and age of the patient, and the



probabilities of his being brought periodically to the dentist, with a true desire to save the teeth. If we have found a decidedly unfavourable answer to these inquiries, we should tell the parents that little or no good can come of stopping the child's teeth.

We must also, of course, guard against having a too hopeless opinion of a case. Though the general aspect of the teeth may at first sight be unfavourable to stopping them, it might not be right to decide against trying to save them. A child of twelve years old, for instance, who has several teeth decayed—molars and upper incisors—if they are not chalky or opaque, and if the history of the parents' teeth is good, the patient not a delicate child, and the decay has not reached the pulp in the front teeth, then it would be quite right to undertake to try and save them. Possibly the patient may have lately been slightly out of his usual health, the oral secretions have been altered, and when that passes away, the teeth may be saved without much difficulty. However, as no rule can be laid down, we must only consider what our experience will warrant us to expect, and be guided accordingly.

In many cases we find it advisable to leave the molars alone, but desirable to save the front teeth and bicuspsids. Of course the loss of the molars is to be regretted, though it were only to prevent a too close bite. Where all the back teeth are early lost, the points of the lower front teeth will in many cases eventually strike behind the upper front teeth close to the gum, and possibly cause protrusion of the upper front teeth. I have seen it also cause one or two of them to be elongated, or partially dislodged from their sockets, and occasion slight suppuration at the root.

In removing decay I find it a good thing to begin with small or narrow pointed excavators, which cause less pain, because it is often inconvenient to apply an obtundent to a child's tooth. I depend very much on oxyphosphate stoppings, excepting in interstitial decay, extending up to the gum, which requires amalgam. Gold, which makes our best stoppings, is not so much the best for children's teeth, considering their vascularity; besides, we should not inflict a protracted operation on a young patient when it can be avoided. My practice is to stop with plastics till the patient is old enough to easily bear insertion of gold.

If with temporary or other stoppings we can save the teeth up to the age of fifteen, after that our greatest difficulties are over. But what we want to learn is, just to know at first sight what cases to

undertake and what *not* to undertake. To know that is, I believe, more valuable than knowing how to stop these teeth well.

I think we shall usually find our patients satisfied with our advice, though that advice should be to leave the teeth alone. I recollect, however, two cases where a patient, after I had advised against stopping the teeth, had gone to another dentist and had them filled. When I saw them again, in one case the stoppings were gone, in the other case the teeth were gone. I cannot think it was for the sake of a fee that these teeth were stopped, much more likely it was simply an error of judgment on the part of the dentist as to the possible permanency of the work. Children should be taught at an early age the use of the tooth brush, and to use it at least twice a day. Young patients with several stoppings in their mouth should be told to brush the stoppings vigorously, otherwise we may hear of them brushing them *lightly* for fear of spoiling them.

I am not aware that we can do anything in the way of constitutional treatment. It has been said, I do not know with how much truth, that any mineral substance which should give us phosphate of lime for the bones and teeth cannot be assimilated into the body. It must first be taken up by the vegetable, and from the vegetable assimilated into the animal system. On the other hand, some dentists say they have seen marked beneficial effects on the teeth from the use of lime water. In this country we have little need to advise food which will give bone-forming substance, because most children take oatmeal porridge once a day, and eat plentifully of bread.

We are sometimes asked if the teeth of the present day are more liable to decay than were those of two or three generations back. We may have our own opinion of that, but we have no statistics, and nothing to show to prove it. But if it be true, we have all the more need to discuss the subject of soft teeth.

#### DISCUSSION.

Mr. CAMPBELL said—This subject is an interesting one. Cases differ so much from each other that we cannot have definite rules to guide us in practice; success or otherwise must depend on the judgment of the practitioner. We have, however, generally recognised principles which should help us to determine our line of treatment—one of these in conservative dentistry is to do all we can, and we can do a great deal, to save teeth. For my

part I would rather go to the extreme in my conservative efforts than to extract a single one which might possibly be saved. With Sullivan gutta percha and phosphate cements we can do a great deal to retain even soft teeth. For these it is often unnecessary to give much pain; by merely cutting the edges of the cavity with a fine cut burr, leaving the soft dentine at the bottom, and otherwise carefully preparing the cavity, a successful stopping should be the result. I have found teeth filled in this manner lasting much longer than I could have anticipated. Where there is crowding, and several teeth decayed, four of the worst opposing bicuspid or molars should be taken out, and an effort made to save the others.

I would much rather fail occasionally than not make an attempt to save the teeth of my younger patients, where there is any prospect of doing so. We should not mind what the public will say or think about our mode of practice; we ought to do our duty.

Mr. Stirling referred to a case where fillings had given way within three months after insertion. This, to me, looks more like fault in the operator than in the teeth. I have rarely found it necessary to extract all the teeth in either jaw from patients who are still in their teens. When this is done, especially in the lower jaw, I should consider it a great misfortune.

With reference to milk teeth, I think it is greatly to be regretted so little is done to them. I frequently fill these teeth, without, as a rule, doing much to the cavities, using Sullivan or gutta-percha.

Mr. HEPBURN said—The subject of Mr. Stirling's paper was a most practical one, and deserved, and would repay, the gravest consideration. There was no doubt that at the present time the general tide of professional opinion and practice rose in favour of conservative dentistry, but he thought it quite possible it might run too strong and too far in that direction, as there must sometimes be a condition of things when any expenditure of time and labour would be useless. No man would be considered wise who would expend his means in propping or plastering up some ruinous old house, the foundations of which were giving way, and the timber in it rotting. Something like the same common-sense and judgment are surely required by the practitioner in the treatment of such cases as are covered by Mr Stirling's paper. There was a strong and

laudable desire in many young practitioners to attempt to save every tooth and root that came in their way ; but that desire required the curb at times, and should be used with care and judgment, as they all knew that not unfrequently such attempts ended in failure and disappointment, to the annoyance of patient and practitioner. He thought that, in such cases as those referred to in the paper, they had to consider not only the condition of the teeth, but the conditions and surroundings of the patient, as unless the parents are prepared to expend a great deal of time, attention, and money for their preservation, all attempts to save them permanently must fail, and it were worse than useless to begin a work from which no permanent good could be derived. Should it be decided not to make the attempt, then the question of extraction or no comes in. This will depend on the health of the patient, whether they are suffering from the teeth ; also whether their extraction interferes with the proper eruption of any other teeth or the development of the alveoli. The proper treatment of all such cases must depend on their individual merits and the experience and judgment of the practitioner.

Mr. WILSON said he agreed with what had been said by Mr. Hepburn. Admitting that at one time there was too decided a tendency to the summary measure of extraction, they were, in his opinion, now going too far in the opposite direction.

He advocated quite as strongly as Mr. Campbell did the retention, by stopping or otherwise, of all the temporary teeth not causing mischief until their natural shedding. The premature removal of the molars was almost certain to be followed by the moving forward of the first permanent molar, thus losing whatever space the permanent canines might have gained by the lessened space required by the bicuspid. Occasionally it went much further, and the second bicuspid was erupted inside the arch. He mentioned these teeth specially, as they were almost the only temporary ones they had to treat.

The too early removal of decayed first permanent molars was also liable to do harm, while, if done at a later stage, good might result. On the other hand, he considered it a mistake to retain hopelessly decayed or malformed laterals or bicuspids, the spaces caused by their removal being soon obliterated, and overcrowding was a heavy factor in the war with decay.

But Mr. Stirling, so far as he understood, while against the



indiscriminate stopping of soft seriously decayed teeth in young subjects, did not advocate their summary removal so long as they led to no complication. He asked them simply to admit that nothing they could do would be of more than a temporary benefit, not worth the unpleasantness involved to the subject, the trouble to the operator, or the expense, present and prospective, to the parents.

If left alone, such teeth would in most cases soon become level with the gum, when the question as to their retention or removal, one foreign to Mr. Stirling's paper, would come up for decision. As regarded the wholesale removal of decayed teeth, not necessarily beyond redemption so far as stopping was concerned, he considered that when their presence was, in the judgment of the medical man in charge, the cause of serious nervous affection, and he ordered their removal, the dental surgeon was bound to carry that order into execution.

Mr. BIGGS said he concurred in the general sense of Mr. Stirling's paper, but he thought that it was more a matter for individual judgment than for a society to affirm how far we are justified in endeavouring to save soft teeth in children. But, for his part, he believed in conservation as far as that was possible or practicable. He had often been surprised at the marked improvement occurring in teeth he had considered perfectly hopeless. So many things entered into the question that he feared no law could ever be binding on the profession in regard to this matter. For instance, the health of the child and its age were such important factors that no case could be weighed without them. He thought that, however hopeless the teeth might seem, if we considered it important that they should be retained, and explained how temporary our work was likely to prove, declaring, as our object, the maintenance of the symmetry of the jaws and their growth—in fact, giving frankly our opinion of the case and its probable cost—we could then leave it for the parent to decide whether we should go on with it or not. In the case of a patient of 15 years old or so, he did not think it would be acting wisely if all in our power was not done to prevent loss of any of the teeth, except, perhaps, the first molars, because the wholesale removal of teeth at that age meant destruction to the features probably ere the patient reached even 50 years; besides, the consequent absorption of the alveolar process is occasionally so extensive as to, in some instances almost to, preclude the wearing of artificial dentures.

Mr. WATSON thought it better to endeavour to save soft teeth,

both of the temporary and permanent series, as long as possible, unless they were affecting the health of the patient, when it was better to take them out. As regards the benefit to be derived from the use of lime water, he considered it of little service, as it was doubtful if any was assimilated; more good would probably be obtained from the use of lacto-phosphate of lime.

Mr. MACKINTOSH said he agreed with the remarks made by Mr. Campbell, and thought it right to try and save even soft teeth, and also the temporary teeth, until the proper time for losing them. He used copper amalgam, which did perfectly well in wet cavities, and tended to harden the tooth.

The PRESIDENT said that the Society was much indebted to Mr. Stirling for bringing this important subject before them. He thought, however, that he was too pessimistic in the general view of the method of dealing with such cases. It would be admitted by most that no cases were so discouraging and appalling at first sight as where a child of 10 or 12 years of age is presented with a whole lot of interstitial decays, nothing having been previously done. It often gave one a feeling of hopeless despair, and prompted desperate remedies. Still, in spite of bad appearances, it should be a general rule to attempt to save them, in the hope that with advancing years an improvement would take place. The six-year-old molars in such cases were generally irretrievably lost, but from the bicuspid forward there was generally something left for conservative dentistry. At present he had a case of a boy of 13 years, where the crowns of both centrals were broken off, the root canal of one with decomposed pulp; the laterals also were badly decayed. Here the central roots were filled and the laterals patched up, in the hope that something might be made of them in the future. It was wonderful, sometimes how hopeless-looking cases pulled through.

Another reason for keeping the roots towards the front as long as possible was that the contour of the mouth was preserved, and it gave the supporting alveolus a chance of solidifying, so that if necessary to remove them afterwards, a firmer basis was left in the way of ridge than if they had been removed early. One of the worst cases he had ever seen was the case of a lady who had had all her upper teeth removed while in her teens. There was no true ridge, only a roll of gum fairly prominent, but very mobile, so that the suction piece, while adhering, could be moved some little way from side to side.

As to fillings themselves, in the worst cases for molars, there could be little doubt that Sullivan's amalgam held them together better, as a rule, than anything else, though oxyphosphate did very well for crown cavities. In weak, walled cavities it was a capital plan to line with oxyphosphate and fill with amalgam before the former was fully set; or where there was a doubt as to the healthy condition of the pulp, the cavity may be lined with oxyphosphate and the amalgam put in at another sitting, provided no irritation had occurred in the interval. Where the walls were fairly strong and able to resist the wedging force, tin and gold combination served a very useful purpose.

Mr. STIRLING, in reply, said:—

Mr. Campbell seems to be quite opposed to what I have said in my paper; he says he would stop a tooth though it were only to last for a year. So should I if an adult, and especially if it were a front tooth, but not for a *child with soft teeth*. Mr. Hepburn, I think, understands me better when he says that in trying to save soft teeth in children's mouths we ought to consider what is likely to be the future of such teeth, and it is useless to begin to do any work from which no permanent good can be derived. Mr. Wilson says we lose room in the jaws for the permanent teeth when we extract the temporary teeth early, and Mr. Watson, for the same reason, would stop soft temporary teeth, in order to retain them as long as possible. I have said I do not believe any harm will result from the extraction of temporary molars, and Mr. Tomes has recorded a case where he extracted all the teeth from a child of six years old, and the permanent teeth came in in regular and good order. Was that an exceptional case, or was it an exception because it was watched?

We have overcrowding in the permanent teeth when there *has* been, and also when there has *not* been, extraction of temporary teeth. Also, we have *no* overcrowding of permanent teeth after even extraction of temporary teeth. The eye-teeth are the only temporary ones I hesitate to extract.

With regard to what the President said, as to the ultimate loss of alveolar ridge when teeth have been extracted early in life (also referred to by Mr. Biggs), that does not seem to me to be the case. After extraction in old people there is deep absorption of the alveoli, but in young people there is to some extent a filling up of the alveoli, as well as absorption of the walls. Not, perhaps, in every

case, but it usually takes place to some extent, and as for the soft palate which had just been referred to by the President, which offers no stability to a denture, we find that at all ages, and it depends, not on the length of time the teeth have been extracted, but on the individual.

The Secretary read a paper by Mr. Walter Whitehouse, L.D.S. (Edin.) London), entitled "Pain after Filling."

### DENTAL HOSPITAL OF LONDON.

THE Annual General Meeting of Governors of the Dental Hospital of London was held at Leicester Square, on March 15th, Mr. THOMAS ARNOLD ROGERS, one of the Vice-Presidents, in the chair.

The Committee of Management presented their thirtieth annual report, in which they congratulated the Governors on the continued success and prosperity of the institution. The total receipts for the year amounted to £4,223 11s. 4d., including £1,961 3s. 6d. to the Extension Fund. The total expenses were £3,074 19s. 7d., of which £1,624 11s. 8d. was on account of Extension Fund. There is a deficit of £5,726 on Extension Account.

The following table gives, under various headings, a detailed account of the operations performed :—

Number of Patients	...	...	...	...	32,235
Extractions	{ Children under 14	...	...	...	4,806
	{ Adults	...	...	...	11,695
	{ Under Nitrous Oxide	...	...	...	7,606
Gold Stoppings	...	...	...	...	3,854
White Foil ditto	}	...	...	...	9,915
Plastic ditto					
Irregularities of the Teeth treated mechanically	...	...	...	...	1,760
Miscellaneous Cases	...	...	...	...	5,693
Advice Cases	...	...	...	...	2,112
TOTAL	...	...	...	...	47,441

The increase in the number of cases attended to during 1887, as compared with the previous year, amounts to 3,696.

The Medical Committee beg to thank the Managing Committee for carrying out the scheme for the enlargement of the Hospital.



The increased space and accommodation, especially in the "stopping-room" and "lecture theatre" have already proved of immense benefit, and they feel sure that, when the alterations on the ground floor are completed, the additional "waiting-room" accommodation will be a great boon to the patients.

The CHAIRMAN, in proposing the adoption of the Reports, gave a sketch of the history of the institution. He referred to the founding of the Hospital in Soho Square, December, 1858, when the staff consisted of only six dental surgeons:—Mr. (now Sir John) Tomes, Mr. Cartwright, Mr. Harrison, Mr. Hepburn, Mr. Chas. Rogers and Mr. Underwood. The time devoted to the work of the hospital was one hour, 8-30 to 9-30, each week-day. There were two operating chairs, and rarely more than three or four patients a day. Now, in their present quarters, the work of the hospital was conducted by a staff of 26, there were 48 chairs, and an average daily attendance of 55 students and of over 100 patients.

So great a work as that he had passed very lightly in review had not been accomplished without the devotion, on the part of many, of an amount of time and labour and anxious thought, which could be appreciated only by those who had been engaged in such undertakings. They had a goodly list of subscribers and many warm friends, and their own profession had given the institution a very liberal support.

Sir EDWIN SAUNDERS proposed a vote of thanks to Mr. T. A. Rogers, which was seconded by Mr. GREGSON, and carried.

The company then proceeded to inspect the recent additions, alterations and improvements which had been made to the Hospital, after which the meeting terminated.

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### GENERAL MEDICAL COUNCIL.

At a meeting of the Executive Committee, held on February 27th, it was resolved, with regard to the employment of Unqualified Medical Assistants, that in its opinion:—

"A registered medical practitioner would render himself liable to the censure of the Medical Council in case of the employment of an unqualified assistant in the practice of medicine, surgery, or midwifery on behalf or for the benefit of such registered practitioner, either in complete substitution for his own services, or under

circumstances in which due personal supervision and control are not, or cannot be, exercised by the said registered practitioner.

"The Executive Committee furthermore takes this opportunity of stating, in reference to the procedure known as 'covering,' that in its view a registered practitioner *covers* an unregistered person, when he does, or assists in doing, or is party to, any act which enables such Unqualified person to practise as if he were duly qualified."

In submitting to the General Council this *Report*, the Executive Committee would, however, call attention to the following *Resolution* passed by the Council on April 21, 1883:—

"That the Council ask for legislation to the effect that any registered practitioner practising for gain, who knowingly and wilfully deposes a person not registered or qualified to be registered under the *Medical Act* to professionally treat on his behalf, in any matter requiring professional discretion or skill, any sick or injured person, shall be subject to the same legal liabilities as a person who falsely represents himself to be a legally qualified medical practitioner; but with special proviso that such enactment shall not hinder any duly regulated training of pupils in Medical Schools or otherwise by legally qualified practitioners, nor the use of trained pupils in partially treating the sick or injured under the direction, supervision, and responsibility of such practitioners, nor any legitimate employment of nurses, midwives or dispensers."

### THE MEDICAL, DENTISTS' AND MEDICAL STUDENTS' REGISTERS.

THESE Registers, which are in much demand, were published on the 21st ult., and copies may now be had from Messrs. Spottiswoode & Co., the Medical Council's publishers.

The *Medical Register*, corrected and revised throughout from all available data, has had prefixed to it some additional preliminary matter of interest, in the form of statistics and tables. From these statistics it appears that, whereas the number registered during 1877 was but 940, the number registered last year was 1,531 (showing an increase of 591); while the total number in the Register for 1876—the first year in which any such data as are now presented were ascertained—was 22,200, the number on the present Register is 27,246 (showing an increase of 5,046), whereof about 66 per cent. were registered in London, 19 in Edinburgh, and 16 in Dublin. The number of pages in the present Register is 1,172—a large increase

from the 335-paged volume that sufficed for 1859, the 548 pages for 1870, and the 598 pages for 1876.

The *Medical Students' Register* has prefixed to it similar tables and statistics, showing, *inter alia*, for each division of the United Kingdom the respective numbers registered in 1887 as having passed the several recognized examinations, and the numbers registered at each place of medical study.

The *Dentists' Register* has been subjected to a most thorough and searching investigation, a process already rendered absolutely necessary owing to gross carelessness or neglect on the part of registered dentists. Soon after Midsummer, inquiry-letters, under section 12 of the "Dentists' Act," were sent to all persons on the *Register*, and, three months later, nearly a thousand *second* inquiry-letters had to be sent, as prescribed in the cited section, to those who had not answered the first inquiry. By this heavy labour an unprecedented amount of errors has been disclosed and corrected. From the tables and statistics contained in the preliminary matter of the *Register*, it appears that the Unqualified Dentists were, in 1879, 4,806, or 91 per cent. of the whole, while the Dental Licentiates were 483; but in the present *Register* the Licentiates have increased to 977, and the unqualified persons have diminished to 3,889, or 71 per cent. of the total, showing already a decrease of 12 per cent.

There are several instances where registered persons having additional qualifications—L.D.S. and Surgical—have not registered such. Surely the five shillings registration fee cannot be the cause of these omissions.

#### DEATH AFTER TOOTH EXTRACTION.

The *Sheffield Telegraph* gives an account of an inquest held at Stalybridge upon a child aged five years. The child had suffered from toothache and went to a herbalist, who extracted the tooth. There was a good deal of hæmorrhage, and shortly after the child died "from debility from the loss of blood." Whether the herbalist was in any way to blame for want of skill or carelessness during the operation does not appear in this report, but it is not to be expected that his "profession" qualifies him to deal with the more serious accidents and complications which unfortunately do sometimes occur during or after the extraction of teeth. Surely such a sad case as this should have some influence in deterring the public from patronising unqualified practitioners.—*Lancet*.

## THE STUDENTS' SOCIETY OF THE NATIONAL DENTAL COLLEGE.

THE last ordinary monthly meeting of this Society was held on Friday, March 2nd, Mr. MORGAN HUGHES, M.R.C.S., L.D.S.Eng., President, in the chair.

Mr. Fripp showed the model of a girl's mouth, 20 years of age. The teeth of upper jaw were very small. There were centrals, no laterals, the canines cone-shaped and bicuspid very small, and one very small molar on each side. In the lower jaw the teeth were very small, and there was only one molar. Two sisters had similar abnormalities. The patients were of good physique and healthy.

Mr. Clarke exhibited the model of a mouth showing transposition between the right lateral and canine in upper jaw.

Mr. James Rymer read a paper on "Dental Mechanics and the Limits of Dental Surgery."

Considerable discussion ensued, after which the meeting adjourned.

## COCAINE AND ITS SALTS.

*Abstract of a Paper read before the Pharmaceutical Society of Great Britain, and published in the PHARMACEUTICAL JOURNAL.*

By Dr. B. H. PAUL.

OUR knowledge of the chemistry of cocaine and its salts is still less complete than is desirable, and although it may be true that the cocaine salts now supplied for medical use are in some instances better than they were when first introduced, it seems unquestionable that they are still far from being constant or uniform in their state of purity and general character. How much of the doubt and suspicion which have resulted from the experience gained by the use of cocaine in dentistry may be due to variation in the quality of the salt used or to the presence of impurities was not his business to consider: but as the subject has lately been exciting considerable interest among dental practitioners it may be useful to direct attention to some of the observations that have been made as to the chemical characters of cocaine and its salts, and at the same time show by the analysis of a number of different samples of the hydrochloride—the salt which is most frequently used—that there are considerable differences between the products of different makers.

He did not think that the salt in a pure state ever assumes the amorphous condition. As regards the salt met with in commerce



as cocaine hydrochloride, there can, however, be no question that it frequently presents an amorphous character. It is also true that when such a salt is submitted to the action of solvents or precipitants the crystalline condition is assumed but very slowly, and then only by some portion of the salt or base separated from it. These are indications, however, which appear to point distinctly to the mixed nature of the material. Pure cocaine is very readily crystallizable, and its hydrochloride also presents this characteristic, notwithstanding its great solubility.

He had devoted some attention to the study of the crude cocaine now being extracted from coca leaves in South America. For some time past considerable quantities of this crude cocaine have been manufactured in South America for export to European markets in place of coca leaves, which have been found liable to deterioration in transit. The material referred to presents the appearance of a white or yellowish pulverulent substance compressed into thin cakes. It contains not only earthy substances, sodium, carbonate and lime salts, but also a waxy substance and traces of petroleum. The manufacture of this crude product has most probably been carried out by extracting the coca leaves with petroleum spirit, washing out the alkaloid with an acid, and then precipitating it with lime or sodium carbonate. It is variously represented as containing from 80 to upwards of 90 per cent. of alkaloid, and is probably the source from which cocaine salts are now largely prepared. In working with different samples of this material he found that it varied considerably in the amount of crystallizable cocaine it contained.

In some instances there was also a large proportion of uncrystallizable base that was distinctly different from cocaine. It is easy to prepare, from some samples of this material, a good yield of hydrochloride that is of the same character as the salt, by merely evaporating to dryness a neutral solution of coca alkaloids in hydrochloric acid; but when pure cocaine or a crystallizable hydrochloride are required greater difficulty is experienced, and sometimes the yield is very much less than the amount of alkaloid present, since a large portion of this is amorphous. He had had the opportunity of examining several parcels of this material, and in one instance a quantity that was bought as containing 85 per cent. of cocaine did not yield more than one-half the corresponding quantity of crystallizable hydrochloride. The remaining portion of the alkaloid present was precipitated from solution in hydrochloric acid in the form of

oily globules, which collected after a time at the bottom of the liquid as a viscid semi-transparent layer. This condition was sometimes maintained for several days, but eventually the mass began to assume a crystalline structure.

Sometimes this crystallization took place more quickly, and the viscid oily globules first separated became more or less crystalline before settling to the bottom of the liquid, which, in all instances, remained quite milky for some considerable time, thus presenting a marked contrast with the rapid clearing of the liquid which takes place when pure cocaine is precipitated from a solution of the hydrochloride. The precipitate was also very different in character from that presented by precipitated cocaine, and instead of being similar in appearance to ammoniophosphate of magnesia, it was so pasty that it could not be collected for weighing in the usual manner by filtration.

It seemed evident from these results that the substance in question was not altogether cocaine, and though a solution of it in hydrochloric acid produced local anæsthesia when applied to the lips or tongue, showing that there was some cocaine present in it, the other characters of the substance suggested that they might be due to an admixture of what has been so often spoken of as "amorphous cocaine." To ascertain if that were the case, a quantity of the substance was dissolved in hydrochloric acid, and fractionally precipitated; but without any great success in separating it into portions materially different in physical characters.

From what has been stated it will be evident that in the preparation of cocaine salts there are several sources from which impurities of different kinds may be introduced into the product. It is therefore necessary that the characters of the commercial hydrochloride should be carefully scrutinized.

Cocaine hydrochloride should, of course, be free from colour and give a perfectly colourless water solution. That is sometimes the case with commercial samples, but not always, and Dr. Squibb states that not one of the kinds examined by him were perfect in this respect. The salt should also be free from odour; but very frequently that is not the case, and it either smells of a solvent that has been used in the process of manufacture or has a peculiar butyric or mousey smell that may arise from partial decomposition or the presence of some impurity. Sometimes also there is a distinct benzoic odour; but in any case a sample that has a distinct odour should be looked upon with doubt.

The neutral condition of cocaine hydrochloride is also a point that should be carefully observed.

As regards the method of testing this salt he did not think the chloroform test of much service. In his opinion a much better plan of ascertaining the relative quality of different samples of cocaine hydrochloride is to determine the amount of alkaloid obtainable by precipitation of a water solution with ammonia. The chemically pure anhydrous salt  $C_{17}H_{21}NO_4HCl$  contains 89.25 of cocaine, and when the solution precipitated is not too dilute a precipitate closely approximating to that amount should be obtained if the salt tested does not contain impurities that are more soluble in water than cocaine is.

It would appear that the quality of cocaine hydrochloride varies very much. In fact the salt is sold at a price that is much too low to ensure its purity. Those makers who produce a pure salt are heavily handicapped if they attempt to compete with others who supply an inferior article at a low price.

The principal impurity in the salts corresponding to the last four samples examined was undoubtedly the hydrochloride of the amorphous alkaloid which is associated with cocaine in coca leaves, and its presence justifies the conclusion that the products in question had been made by evaporating down a solution of mixed bases in hydrochloric acid.

For the purpose of ascertaining the presence of an amorphous base in cocaine salts there is no method of testing at present known better than precipitation with ammonia. This should be carried out in the way directed by MacLagan, and also with a stronger solution, so as to observe the character of the precipitate and ascertain the amount obtainable. Taking all things into consideration, it appears, however, to be a mistake to attempt the purification of the hydrochloride at all; it is so very soluble in water and in alcohol, &c., that the loss in operating upon it is necessarily considerable on that account alone. The alkaloid itself is much more susceptible of purification, and it may be obtained in very fine crystals either from ether or alcohol solutions. With pure cocaine there is no difficulty in preparing a good hydrochloride, since the neutral solution of the salt bears evaporating down without decomposition, and the salt when pure and dry can easily be converted into a good-looking crystalline condition by shaking its alcoholic solution with ether.

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## Editorial.

## UNQUALIFIED ASSISTANTS.

THE recent recommendations of the Executive Committee of the Medical Council (see page 180) betoken some amelioration of what has long been a "crying evil" in the Medical Profession. The employment of unqualified assistants to take the place of and represent the qualified practitioner is an abuse of public confidence. The chief object of the Medical Act is to protect the public. But the system known as "covering"—where a qualified man shields the shortcomings of his unqualified assistant—is one form of the reputed "coach and four" driving through Acts of Parliament.

The same principle attains in the practice of Dentistry. Many practitioners have branch establishments at which they are represented by unqualified persons. These representatives the public are led to believe to be qualified to practise. That is a fraud. Though the issues are not so grave with regard to Dentistry as in the case of the Medical Profession, yet the difference between the two is one rather of degree than of quality. Therefore it is to be expected that the Medical Council will equally look after the interests of the public and of the Dental Profession in this matter.

Referring to this subject, the *Lancet* says:—"We commend to all practitioners the Memorandum of the Medical Council, in which the Council seeks to define the kind of employment of unqualified assistants which would bring registered practitioners under the risk of censure by the Medical Council. There is still a great recklessness in this matter, some practitioners using unqualified assistants in places or circumstances where obviously there can be no adequate supervision of their work by the principal. The public is often quite unaware that the agent of the practitioner is unqualified. In every aspect of it this use of unqualified assistants is unwarrantable, and the Council would fail in its duty if it did not punish those medical men who persist in spite of repeated warnings. It would be lamentable that a name should have to be removed from the Register on this ground; but the Council, in such a case, would be acting for the protection of the public and the



vindication of the law, which aims at making and securing for the public the clearness of the distinction between qualified and unqualified practitioners."

The British Dental Association should, at this opportune time, urge the Medical Council to, in like manner, exercise its powers in connection with similar abuses which are well known to exist in the Dental Profession.

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### OBITUARY.

GEORGE HILDITCH HARDING, L.D.S.Eng.

It will be with extreme regret that our readers will learn of the death of Mr. George Hilditch Harding, 22, Finsbury Square, E.C., which occurred on the 23rd of March, at the age of 36. After about a fortnight's illness with pneumonia, the career of this rising practitioner was suddenly terminated, and his bright prospects have become as a dream of the past. He was a student at St. Thomas's Hospital and the Dental Hospital of London. At the latter school he distinguished himself by appearing in the prize list. He obtained the L.D.S.Eng., in '75, was a member of the Odontological Society, and of the British Dental Association.

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ALFRED JOHN BEARD, L.D.S.I.

WE regret to announce the death of Mr. John Alfred Beard, of St. Wilfred's Terrace, Ripon. Having ruptured a blood vessel, he died suddenly on the 20th of March.

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### GOSSIP.

It appears from a patent granted to J. Karpeles, of Vienna, that amber shavings may be concreted in a vulcanizer having an internal screw for closing the mould. The temperature necessary for this process is 300° Cent. 572° F., at which degree of heat amber becomes viscous.

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THE most recent researches on the importance of the nucleus to the life of the cell, especially the knowledge that, when non-cellular organisms are cut into pieces, only those parts exhibit a complete

regeneration which contain a portion of the nucleus. Professor Kossel has discovered among the substances which compose the nucleus one which he has named adenin, and which he thinks plays an important part in its physiological action, owing to the ease with which it can be reduced. He also says that adenin is largely produced in certain pathological conditions of the human body.

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WHEN atmospheric air is contaminated with one part in a thousand of carbonic acid, it is considered inimical to health. There has lately been patented in Germany an instrument said to be capable of showing with precision the proportion of  $\text{CO}_2$  present at any moment in a confined space. It consists of a thread of cotton 12 inches or more in length, which is suspended by one end in front of a scale, upon which is marked quantities from 0.1 at the lower end to 10 per 1,000 at the upper end. Through a fine syphon there is discharged every 10 seconds a drop of red fluid, which is absorbed by the cotton and trickles down its length. This fluid becomes bleached by the carbonic acid present in the air, and the smaller the proportion of it present the greater the space through which the fluid passes before decoloration takes place.

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HERR STAHL has inferred from experiments that the excreta of plants, known as raphides, are a protection to plants against being eaten by animals. Many plants which are considered to be poisonous, as *Arum maculatum*, the cuckoo plant of our hedgerows, owe their burning taste to these raphides, which, forced from their cells, enter the tongue and palate, while the juice of the plant after filtration has a mild taste.

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THE famous literary problem, who was the author of the Thousand and One Nights, generally known as the Arabian Nights, has lately been partially solved. These tales were first given to the world by Galland, the great French Orientalist, who translated them from an Arabic manuscript, and M. Hermann Zotenberg, the keeper of Eastern manuscripts in the Bibliothèque Nationale in Paris, has settled the question on Galland's own authority, having fortunately found Galland's journal, which recorded that on Monday, March 25th, 1790, he met a certain M. Hanna, a Maronite of Aleppo, who sold him these Eastern tales, of which Galland was careful to make

copious summaries in his journal. The Maronite Hanna even wrote out for Galland the Arabic text of the story of Aladdin. Whether Hanna belonged to Aleppo or to Damascus does not appear, for Galland attributes him indifferently to both these cities.

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'Tis the way of many minds to underestimate the value of the humble members of the animal kingdom. It is especially so with insects, which we too often think of as only made to cause annoyance and trouble. We lose sight of the fact that every insect praises God more in rubbing his legs together than we do, when our orisons go out from ungrateful hearts. Let us take our stand in a field of Dutch red clover in full bloom, and we may learn, if we have patience enough, how important a part even the humble bee plays in the cosmical economy. We hear his merry boom in F, an octave below F of the first space, as he swishes past us bent on his task. He visits flower after flower and sucks out the homied nectar, which only the humble bee's tongue is long enough to reach. This is for himself and his progeny and for other creatures he knows not of; but this is only half his task, and we must capture him in order to learn what is the other half. We find golden grains adhering to his proboscis. These he bears away to other heads of bloom, for, be it known, the flowers of the clover are not self-fertilising, and while the bee riles the next blooms of their honey, he leaves behind him in payment the golden grain adhering to their stigmas, which thus receive the necessary fertilization. Darwin, by experiments, proved that 20 heads of red clover thus fertilized by the humble bee yielded 2,200 seeds, but 20 heads protected from the bees did not produce a single seed.

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THERE is a possibility, says a popular journal, that the electric light may be used in determining the distance of an object—say, an enemy's ship—a light being placed on the head and another on the stern of the searching ship. With a graduated circle, upon which to read off the angles, the rays of light, after being made parallel by a parabolic reflector, or a plano-convex lens, are to be thrown upon the object whose distance is to be found. With half the length of the searching ship as a base line and the determined angle, the length of the vertex can be calculated according to a well-known rule. In theory this possibility has a very rosy appearance, but in practice its rosiness rapidly disappears; for when we consider how small the

magnitude of the base line must be in comparison with any great distance—say a mile or two miles—the angle would be so small that no dependence could be placed in the result.

A BULLET shot out of a rifle, according to the experiments of Kötler, tends to deviate away from the side to which the bayonet is attached to the barrel.

THE existence of a third eye in lizards, named by anatomists the parietal or pineal eye, is also shown to extend to many others of the vertebrates. It was first pointed out in lizards by Graaf and Spencer, and has been further studied by M. Francotte in reptilian embryos, in all of which the nerve connections have been distinctly traced from the epiphysis at the root of the thalamencephalon to the complete development of the pineal organ; but in each of these the optic nerve which connected the organ with the nerve centres disappears in the adult forms. In the lamprey Beard has found it highly developed in a sac under the skin, just behind the nose, with a retina, pigment and the remains of a lense. It is interesting to note that the rods of a retina in the parietal eye are turned towards the light, while in the paired eyes they are turned from it.

IN the bull frog (*Rana pipiens*) the larvæ are usually five inches long, and take from two to three years to complete their transformation. They may be hindered in this, and be made to take twice that time. In this case the larvæ may attain seven inches in length, but will be tailless.

ACCORDING to Murray's theory, the volcanic islands—whose surface is beneath the water—are raised by the deposition of calcareous matter until they reach the line at which the coral builders can work. Then the coral maker builds the reefs which rise gradually until they enclose the water in a complete or incomplete ring, and so form a lagoon. Then comes the deposition within the ring, of detrited particles worn away from the reef by the waves breaking over it, and so the inner channel becomes shallower. This is in opposition to the Darwin theory of subsidence.

SOME curious experiments on the magnetic behaviour of elder pith have been made, with the result that pith balls placed in a powerful magnetic field are found to be strongly attracted.



PHOTOGRAPHS of star groups have been taken at Greenwich with the Sheepshanks' equatorial on curved plates. The general result arrived at was that the field might be used for very accurate measuring purposes.

WHILE lactic and other acids found in the oval cavity have been credited with playing an important part in caries of the teeth, carbonic acid, which is always liberated by fungi and from the saliva, seems to have been overlooked as an important factor in the destruction of enamel, especially on approximal surfaces, where capillary attraction keeps those surfaces constantly bathed with a fluid which must be rich in this acid which has so powerful an affinity for lime compounds.

SIR JAMES PAGET, in his address to the students attending University Extension Lectures, showed how the study of science develops the power of observation, fosters accuracy of thought, gives men a vivid conception of the difficulty of attaining to a real knowledge of the truth, and makes them familiar with the methods by which they may pass from that which is proved to the thinking of what is probable.

MONTHLY STATEMENT of operations performed at the two Metropolitan Dental Hospitals, and at the Manchester Dental Hospital, from February 1st to 29th, 1888 :—

					London.	National.	Victoria.
Number of Patients attended ... ..					—	1804	920
Extractions	Children under 14	...	...	...	332	224	611
	Adults	...	...	...	976	450	
	Under Nitrous Oxide	...	...	...	1042	620	
Gold Stoppings ... ..					510	126	62
Other Stoppings... ..					1182	558	180
Advice ... ..					132	260	—
Irregularities of the Teeth					169	134	—
Miscellaneous and Dressings					430	245	191
Total ... ..					<u>4773</u>	<u>2617</u>	<u>1191</u>

# THE DENTAL RECORD.

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## A CASE OF EPITHELIOMA OF THE GUMS, WITH A FEW REMARKS.

By FRANK LANKESTER, L.R.C.P., M.R.C.S., L.D.S.Eng.,

*House Surgeon, National Dental Hospital, W.*

THE following case came under my notice some few months ago at the National Dental Hospital. Though a purely surgical affection, it, nevertheless, had a dental origin, and will therefore, I feel sure, prove of considerable interest and be of some practical value to the members of our profession. The patient, on presenting himself, complained simply of a "rather sore gum." I elicited the following history:—George H., aged 55, a coachman, with an excellent family history, said he had always enjoyed thoroughly good health himself. During the last twenty years he had gradually lost most of his teeth, so that in the upper jaw only the two centrals and the right canine now remained. Up to about a year ago, however, the left canine root was *in situ*, but covered over by a vulcanite artificial denture, which he had been wearing for several years previously. He did not remember having had any trouble whatever with this left canine root until about eight or nine months ago, when, without any very obvious cause, it became somewhat loose; whereupon he began to "work it about" with his fingers, so that, two or three months later, the root came away altogether. The socket, however, never healed up in the usual way; on the contrary, the vacant space caused by the loss of the tooth had been steadily, though very slowly, enlarging ever since. During the last month the ulcerative process had progressed more rapidly; there had been more tenderness and pain, together with a fœtid discharge. He had previously experienced very little pain. After the root came away, the artificial canine no longer fitted closely up to the gums, so that, three weeks previously to my seeing him, he had consulted a dentist; but the latter merely added

some more vulcanite, so as to form the usual artificial gum. He thus covered up the ulcerating surface, and boxed in the foul discharge, fondly hoping that the "rest" thus afforded would enable the gums to resume their normal condition. A week later, he went to a dispensary, where he was given some liniment, which was, of course, worse than useless in his case. He next sought our advice, but not until three valuable weeks had been lost, owing to the culpable ignorance or surgical inexperience on the parts of the dentist and the "dispensing doctor." The disease was so far advanced that there could have been no difficulty whatever in diagnosing or at least suspecting it, yet the patient was not warned of his condition nor even sent elsewhere for another opinion. And yet men ask what is the use of a dentist knowing anything about general surgery?

*On examination*, patient had a well marked sallow and cachectic appearance. There was a slight fulness and puffiness over the left cheek, whilst, beneath the angle of the lower jaw, was to be felt a hard glandular mass about as large as a walnut.

*Within the mouth*, the left central was very loose, and the right partially so. In the situation of the left canine was a hole extending upwards towards the antrum, and nearly large enough to admit the tip of the little finger. The surface was "dirty" and ulcerating, as was also that of the gum in the immediate neighbourhood, whilst as far back as the tuberosity the surface of the gum was much thickened and nodular, though not actually ulcerating throughout its whole extent. The buccal mucous membrane was becoming involved by the disease, and the tissues all round the growth were much indurated. There was not much discharge, but the breath was very offensive. Patient said he was losing flesh. There was not the least doubt as to its epitheliomatous nature, so I sent him on to St. Thomas's Hospital, warning him that he must not play with the disease any longer. He was at once admitted, under the care of Mr. Clutton. Two or three days later, patient was put under chloroform, and Mr. Clutton removed the lower half of the left superior maxilla, whereupon it was found that the growth extended over to the right side of the septum nasi—a very serious discovery, pointing strongly to a probable recurrence of the disease, owing to the increased difficulty in getting rid of all the tissues involved, besides greatly prolonging and increasing the severity of the operation; the lymphatic glands were left for subsequent removal, when the patient should have recovered from the shock of the operation.

For about a week patient progressed most favourably, when pyæmia suddenly set in, to which he rapidly succumbed. The disease was so far advanced that, had the man recovered from the operation, it would have probably recurred, but the operation would have prolonged his life, and would have prevented the endurance of much subsequent suffering.

This unfortunate termination of the case was much to be regretted, but it does not alter the fact that, had the nature of the disease been recognised in the first instance, the man would probably have been alive and well now. For the operation would have been a comparatively small affair, though, of course, a free excision would have been necessary. There would have been less danger, too, of pyæmia, &c., and the man would have been in a better state of health generally.

In cases like this it is, of course, obviously all-important that an early and correct diagnosis be made. The earlier the stage of the disease, the more difficult necessarily does the diagnosis become, and, therefore, the greater the need of being thoroughly well acquainted with the disease, its diagnostic points, and its serious prognosis.

Epithelioma of the gums, primarily, is somewhat rare, but when it does occur, it will probably be in connection with some long continued irritation, such as that caused by an ill-fitting plate, a carious stump, &c. ; nor should we forget that the sharp-pointed edge of a tooth is one of the most frequent causes of cancer of the tongue. Thus, probably, the dentist will be the first man called upon to give relief in these cases : and if he be able, without delay, to correctly diagnose, and advise as to the treatment of, an epitheliomatous ulcer when present, it will be a great source of subsequent satisfaction and value to both dentist and patient, but especially to the latter.

Side by side with this case we may place an exactly similar one mentioned by Sir John Tomes in the third edition of his "Dental Surgery" (p. 737). Here, also, the disease originated "in the edges of the socket of a dead tooth." But it was early recognised, and the tuberosity, with the hard and soft palates, were excised with the satisfactory result that there has been no recurrence, "a success due to its early recognition."

What, then, are the chief points that will help us to this end ? We should regard with very grave suspicion any ulcerated surface in the mouth, with induration of the surrounding tissues, occurring in



a male over forty years of age, and which has not yielded at all to specific or other treatment, but in spite of it continues slowly but surely to increase in extent, even after any possible exciting cause has been removed. We should notice the general appearance of the patient, and inquire carefully as to whether there be any family predisposition to cancer, and whether the patient be losing flesh. Examine carefully if any of the lymphatic glands be involved, and lastly, we may call the microscope to our aid. Scrape the surface of the ulcer and mix with a drop of water; place on a slide and examine carefully under a moderate power. If the ulcer be epheliomatous in nature, you will most probably find here and there aggregations of epithelial cells, the so-called "birds' nests" or "nest cells." These, then, are the chief points, and it surely behoves us all to bear them in mind.

### ANOTHER PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Continued from page 151.)

ON leaving Niagara Falls we enjoyed a delightfully diversified trip by rail, river and lake to Toronto, the "we," in this case, consisting of the genial Professor of Dental Surgery from Dublin's fair city, a rising barrister of "angelic renown," not unknown in dental circles, and hailing from the metropolis of the world, and the chronicler, a not untravelled Scot, who boasts Auld Reekie as his birthplace; in fact, our own immediate party on board the *Servia*. On the boat we met several old Servians who had been attending the Congress, which led, of course, to a mutual exchange of confidences and experiences. One dear old gentleman, a specialist of world-wide repute, was not unnaturally sore that he had not received a single personal attention or invitation during his stay in Washington, despite the fact that he was vice-president of his section at this Congress and had spent something like £500 in social entertainments at the memorable London Congress. He had also been the victim of what seemed an unparalleled, if not unique, instance of hotel incapacity. The rooms at the International Hotel, for which he had been charged two dollars, according to the extremely moderate arrangement of the Niagara Excursion Committee, were debited for the second night at six dollars, and, *mirabile dictu*, an extra sum of

four dollars for the use of the rooms during the intervening day, simply because the poor old gentleman had been confined to bed.

None of us were impressed with the splendours of the Toronto boat, while the feeding was execrable and the impertinence of the steward outrageous.

At Toronto, thanks to yet other old Servians, we were comfortably lodged, despite the fact that all the hotels were full, owing to the Annual Fair being then in full swing. We owe also a debt of gratitude to the Toronto Club for the privilege of membership during our stay. A couple of carriage drives enabled us to exhaust the prominent features of the city, including what our coachman evidently thought the most remarkable of all. Pulling up where two broad avenues crossed, he pointed out how the four corners respectively represented legislation, education, salvation and damnation, in Government House, a well-known college, a popular church, and an insignificant "pub."

Thanks to the courtesy of one of the professor's relations, who is one of the magnates of the city, we saw the Toronto Fair under exceptionally comfortable conditions. It is an annual institution and seems to combine the attractions of an exhibition of commerce and agriculture, a picture gallery, a flower show, a race meeting, a pyrotechnic display almost worthy of the Crystal Palace itself, and last, but not least, all the usual "fun of the fair." After luncheon with the President of the Association, we were introduced to the Lieutenant-Governor and the Premier of the Province, in whose company we made a kind of state visit round the main buildings, and were finally conducted to the central enclosure of the enormous track, where the prize animals were exhibited and a series of dashing races ensued.

While the barrister was being initiated into the peculiarities of the Canadian Law Courts and the professor was enjoying the society of his private friends, I hunted up the local Dental Dépôt, as being the most likely spot to acquire some information on professional matters. I found that the Toronto Dental School, owing to recent removal into a new building over this dental dépôt, was not yet in a condition for adequate inspection. I was enabled, however, to make the acquaintance of Dr. Willmott, the Dean of the School, and also Secretary to the Royal College of Dental Surgeons of Ontario. Thanks to the conversation we had and some notes with which he has kindly furnished me, I am able to communicate

some information with regard to the state of dentistry in the Province.

Up to the year 1865 it seems that the dental profession in the province of Ontario, and in fact throughout all Canada, was in what may be perhaps best described as a state of chaos—no standard of qualification, no professional recognition, and no association amongst the members of a common profession. In that year, however, efforts were made to get the dental practitioners to associate for mutual improvement, and a Dental Society was effectually organised and established. As all the better-class of practitioners enrolled themselves as members, the movement was at once attended with great success, so much so that an agitation for legal recognition was at once commenced, though without much apparent hope of success. The confederation of the provinces in 1867, which gave the control of all educational matters to the Provincial Governments, entirely changed the aspect of affairs and encouraged further efforts in the way of dental legislation. The Legislature of Ontario was therefore approached during its first session, and before rising it placed on the Statute Book what Dr. Willmott claims to be the first really efficient dental law passed by any legislative body. It is admitted that this law had many defects of detail, which was not unnatural when we consider that neither the legislature nor its dental advisers had any precedent to guide them. The law has since been considerably amended and is considered as nearly perfect as can reasonably be expected. Under this statute the members of the dental profession practising in the province are incorporated as the Royal College of Dental Surgeons of Ontario, confessedly somewhat after the model of our own Royal College of Surgeons. The principal provisions of the Act are as follows :—

First. No one is permitted to practise dentistry in the Province who is not a member of the College. The dental practitioners who, at the time of the passing of the Act, had been in practice for five years were at once made members of the College without examination; all others were required to pass an examination, but, I presume, for a time without any curriculum being required. All members of the College have the title of Licentiate of Dental Surgery.

Second. The entire control of the profession is centred in a Board of Directors and Examiners, seven in number, elected biennially by the members of the College, who meet specially for that purpose and for the discussion of other matters of professional

interest. This Board fixes the condition and standard of the matriculation examination, the term of pupilage, the curriculum of professional studies, and finally examines the students as to their fitness to become members of the College and thereby entitled to enter on the active practice of dentistry in the Province. This Board was also empowered to establish a dental school, which they did in the year 1875. It is, of course, located in the city of Toronto, which is the capital of the Province and the seat of Government. The Faculty hold office during the pleasure of the Board. The furniture, the appliances and the fittings of the Dental School are the property of the corporate profession. The Faculty is a purely teaching body, and as such has nothing to do with either the control of the curriculum or the conduct of the examinations.

Third. A recent amendment makes provision for affiliation with any university or medical school, if such should be deemed expedient. The Board is also empowered to hold real estate, and therefore is not without hopes of some day owning a suitable building for the purposes of dental education. In accordance with this recent provision, very encouraging negotiations have been opened with the Toronto University, which is the university of the Province of Ontario, with a view to having the Royal College of Dental Surgeons affiliated with the University, or of having the present Dental School incorporated with it as the dental department of the University, the University to grant a degree in dentistry, as is done by Harvard and other American universities. From the fact that the Board have been eager to acquire information as to the present regulations of the dental licensing bodies in this country, we are not without hope that it will do itself the justice of making the requirements as nearly as possible identical with those of the British dental curriculum.

Fourth. The penal clause enacts "that anyone not being a member of the said college who performs any dental operation upon, or prescribes any dental treatment for, any person for gain, hire, hope of reward, whether by way of fee, salary, commission, share in the practice, or in any other way whatsoever, shall incur a penalty of twenty dollars, to be recovered by information before a justice of the peace or by suit in the Division Court." The law has been so well enforced that not more than a dozen persons not Licentiates of Dental Surgery are now practising contrary to law. A few of these illegal practitioners claim to be registered in England under the Dentists' Act of 1878. Section 5 of that Act has been altered by the



amendments of 1886, making dentists registered in England subject to the local dental laws on their removal to the colonies. An undoubted grievance of the Colonial practitioners has thereby been entirely removed.

Since the incorporation of the profession in 1868, 458 persons have been admitted members of the College, of whom about 360 are now practising in the province. There are now about 60 indentured students undergraduates of the College, and the average attendance at the Dental School is from 35 to 40. The term of pupilage is now fixed at 2½ years, and the lecture term extends from 1st November to the end of February. The Board of Directors have already decided to extend the pupilage to three years and the lecture term to five or six months.

At a recent meeting of the National Association of Dental Examiners in the United States, Dr. Willmott, on behalf of the Royal College of Surgeons of Ontario, unsuccessfully protested against that Board having declined to recommend its diplomas as sufficient qualifications for practice. It will be better, perhaps, to quote the Report of the Committee at length.

"The Committee to whom was referred the application of the Royal College of Dental Surgeons of Ontario, to have rescinded the action taken by this Association at its Minneapolis meeting, which decided that the L.D.S. should not be accepted as equivalent to a dental degree to save examination by the Board of Examiners, respectfully report that the action taken by this Association should stand, for the following reasons:—

"First—That the L.D.S. granted in Ontario is a licence to practise, not recognised in some of the provinces of the Dominion nor in Great Britain, rather than a degree in dentistry conferred upon the completion of a college education. In this respect it is analogous to the licences granted by our State Boards, which are not generally recognised by the Boards of other States.

"Second—That when L.D.S. is granted as a degree in dentistry, on the completion of the regular course in their school of dentistry, it represents two courses of four months each, while our rules require two courses of at least five months each.

"Third—That in the last announcement they advertise to grant the L.D.S. for a fee, and after examination, upon any non-resident who has been in practice three years, exclusive of the two years of pupilage, *sine curriculo*.

"Upon motion, the report was unanimously adopted."

Without enquiring into the justice of this decision, which fails to recognise some very good points in the requirements for qualification not yet adopted by many of the institutions already affiliated with the National Association of Dental Examiners, it has already evidently been of considerable effect in promoting the prospected extension of the term of dental education. It seems to us that the recognition sought for should not be difficult of attainment, and that the removal of the third objection would only add to the strength of the Colonial College.

For some years past the standard for matriculation has been practically equivalent to that required by the Council of Physicians and Surgeons of Ontario. The curriculum includes two full courses of lectures on operative dentistry and dental pathology, mechanical dentistry, dental *materia medica*, anatomy, physiology and dental histology, with attendance during the same period at the infirmary of the College. The portion of the term of pupilage not spent in attendance on the lectures and hospital practice must be passed in the office of a Licentiate of the Royal College of Dental Surgeons under indentures. The student has to pass two examinations, both written, the primary after the completion of the first course of lectures and the final on the termination of the full curriculum. The examinations are said to be thorough and severe, from 10 to 25 per cent. of the students presenting themselves failing to come up to the standard required.

(To be continued.)

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### THE ODONTOLOGICAL SOCIETY.

THE ordinary monthly meeting of the above Society was held at 40, Leicester Square, on the 9th ultimo, Mr. HOWARD MUMMERY (Vice-President), in the chair.

Mr. REDMAN (Brighton) showed and described an instrument designed by Mr. C. S. Gibbons, of Brighton, for the removal of fangs badly affected by caries.

Dr. MITCHELL (London) gave a description of and exhibited some rubber dam holders, chisels, and a gouge which he had devised and found very useful.

Messrs. BOYD WALLIS and GILBERT WALKER having contributed to the "Casuals,"—

Dr. STRETCH DOWSE read a paper on :—

SOME PRACTICAL POINTS IN THE PHYSIOLOGY AND PATHOLOGY OF  
THE FIFTH PAIR OF NERVES IN RELATION TO INVETERATE  
NEURALGIA.

He did not propose either to follow in the footsteps or tread on the heels of Mr. Victor Horsley's paper of the previous session, which dealt almost exclusively with the surgical aspect of the question, but in the belief that all cases were not adapted to surgical interference, rather to invite attention to and provoke discussion on the medical phase of the subject.

Having somewhat fully reviewed the latest knowledge obtained, both anatomically, physiologically and pathologically; and having quoted one or two cases bearing upon the question—notably a very important, and, as it were, test case of paralysis of the fifth cranial nerve, sensory and motor, published by Dr. Ferrier in the *Lancet* of January 7th, 1888, and bristling with clinical acumen and physiological knowledge—he entered upon what he regarded as the most interesting part of his paper, prefacing it with a reference to the trophic influence of the fifth nerve\*. They were all possibly aware of the existence of a disease known as loco-motor ataxy, but it was necessary to state that ataxy in locomotion did not always exist. There were many objective signs and symptoms, however, connected with the disease which should be of the greatest possible importance to the dentist. The fifth nerve, it must not be forgotten, was a spinal nerve, and its sensory connections were so extensive, and its reflex relations so vast, that it was hardly possible to conceive an essentially sensory disease like that of loco-motor ataxy existing unless the fifth nerve were involved. The involvement of the fifth nerve in loco-motor ataxy had never been recognised to the extent that he (Dr. Dowse) thought it ought to be. It did not seem to have struck neurologists that inveterate neuralgias of the fifth nerve were in part due to sclerosis of the ascending fibres which run into the trigeminus from the posthorn of the cervical spinal cord. He was visiting within an hour of each other two patients; one was suffering from the lightning pains of loco-motor ataxy and rubbing the skin from his thigh, so great was the agony; the other was suffering

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\* The trophic root of the trigeminal nerve arose from a mass of cells at the side of the aqueduct of Sylvius, or, as some would say, the trophic fibres originated in the gasserian ganglion itself. It was clear that they had much to do with the gums and their mucous membrane, and with the tooth pulp.

severely from tic of the gums and parts supplied by the infra-orbital nerve. The definition of the pain in each case was precisely similar ; it came without the slightest warning, and was of the most intense character, and left as it came. There could be no doubt in his mind as to the absolute relationship between these two pains,—viz., of loco-motor ataxy and of facial tic, with or without muscular spasm, known as tic-douloureux.

The most prominent signs of loco-motor ataxy were—ataxic movements ; fulgurating pains ; localised hyperæsthesia ; ocular paralysis ; numbness and other dysæsthesia ; anæsthesia ; staggering with closed eyes ; failure of sexual power ; absence of tendon reflex ; rectal and vesical pauses ; gastric crises ; laryngeal crises ; vesical crises ; severe arthropathies ; amaurosis ; complicating transverse myelitis ; spinal congestion ; paralytic dementia ; vesical catarrh ; pupillary changes.

Of these signs he would only draw their attention to (1), pupillary changes ; (2), ataxic movements ; (3), fulgurating pains ; (4), severe arthropies ; (5), absence of tendon reflexes.

(1). In ataxy the pupils were invariably very small, dilated sluggishly if at all, but contracted when the eye was accommodated for a near object ; again, one pupil might be very large, while the other might be very much contracted.

(2). The patient was unable to maintain the equilibrium in the dark, or when he was made to stand erect with the eyes closed, or he felt himself losing his balance when washing his face.

(3). Fulgurating pains were, in his experience, very diagnostic of the disease, and he had called attention to the fact that these fulgurating pains were in their character and intensity precisely analogous to the pains of the face due to the fifth nerve, and known as tic. He would ask, was inveterate neuralgia of the face due to sclerosis of the cervical branch of the fifth nerve, to its nuclei of origin in the medulla, to its connection with the sensory trigeminal nucleus which lies at the level of the pons, or to its ganglia ? or, on the other hand, was it essentially peripheral ?

He maintained, from analogy, that the lightning pains of the limbs, which were considered as common to sclerosis of the posterior columns of the spinal cord, were identical in character and causation to those pains of the sensory division of the fifth nerve, and known as tic of the face, epileptic neuralgia and tic-douloureux.

(4). Associated with some cases of loco-motor ataxy were found



a peculiar state of the joints, known as Charcot's joints. The pain was characterised usually by enormous swelling from effusion into the joint. It was quite painless, even upon active movement, due to insensibility of the structures with wearing away of the articular ends of the bones. He would ask, was there anything analogous to this in the alveolar processes of the jaws, as well as the tooth fangs or dental pulp?

(5). The pupillary changes might be accompanied with other phenomena, known as tendon reflexes, the most common of which, and the only one to which he cared to call attention, was absence of the "knee reflex." This was elicited by striking the patella tendon below the knee with the tips of the fingers when the leg is semi-flexed, or when one leg is crossed over the other. In health, when this tendon was tapped, the leg was thrown forwards and upwards, but when sclerosis of the sensory channels of the spinal cord existed, the leg was absolutely immovable. He would not weary them further with the signs of loco-motor ataxy; the practical outcome of importance seemed to be in regard to the wholesale extraction of teeth. When in doubt as to the value of wholesale extraction, examine the pupil of the eye, the absence or presence of the knee reflex, and the balancing power of the patient when standing erect with the eyes closed. If the signs were present indicating sclerosis of sensory nerve fibres, or if there were marked hysteria, unlimited extraction would not seem to be justifiable; if, on the other hand, these signs were absent, showing that peripheral irritation was the cause of pain, then, and then only, could any amount of operative interference be recommended as likely to be of benefit.

As to treatment of neuralgias of the fifth nerve, Dr. Dowse quite endorsed Professor Horsley's opinion with regard to "nerve-stretching," but as to "avulsion" he was somewhat sceptical. The best advice which he (Dr. Dowse) could give was to be found in the thoughtful and experienced remarks of their past learned President, Mr. Tomes, in the discussion of Mr. Horsley's paper, "Relief from severe and persistent pain quite justifies any ordinary surgical procedure, but I cannot quite see how relief means cure. How often do we see this word written to a case when the word relief would be far more appropriate."

In the treatment of neuralgias, as far as drugs were concerned, Dr. Dowse put great faith in the value of opium, when it agreed. Broadly, he treated facial neuralgias by drugs as follows :—When of

the supra-orbital nerve, 20 or even 30 gr. doses quinine, just before the time for the paroxysm to make its appearance, and every other night a pill of calomel and gambooge, a plain non-alcoholic diet and plenty of milk. When of the middle and inferior maxillary nerves, he gave iodide and bromide of potassium, with  $\frac{1}{2}$ -drachm doses of gelsemium three times a day. M. Goubler stated at the Société Thérapeutique, January 25th, 1877, that he did not know of a neuralgia of the fifth nerve, even *tic-doloureux*, which had resisted aconotine. Whilst speaking of drugs in neuralgia of the fifth nerve and in the fulgorant pains of ataxy, he (Dr. Dowse) had been much pleased with the effect of antipyrine in one scruple doses every half-hour until the pain was relieved.

He had for some time injected an ethereal solution of ergotine with marked good effects in trigeminal neuralgia and sciatica. He usually injected 1 gr. ergotine dissolved in 5 mins. ether; in facial neuralgia he injected into the scalp immediately behind the ear, and in sciatica he pushed the needle of the syringe well into the sciatica nerve. He had used a 1 per cent. solution osmic acid in the same way with much the same result. Dr. Dowse referred to a pamphlet by J. Montaign Didsbury, translated by Mr. Boyd-Wallis, on "The Treatment of Inveterate Neuralgia of the Fifth Nerve," advocating the division and cauterization with the actual cautery the auriculo-temporal nerve, on the assumption that "it is the shock to the grey axis of the medulla, produced by cauterization, that effects the cure; the application is made to the helix of the ear." Dr. Dowse thought there was much to be said in favour of the treatment.

Finally, a few words on the application of galvanism. He preferred the voltaic or galvanic current to Faradization—more frequently he combined the two, the voltaic current being in excess of the Faradaic. He never used strong currents, 2, 3, or 4 milliampère of the continuous current being sufficient. For neuralgia of the first division of the fifth nerve, he plugged the nostril with very soft sponge or cotton wool, and into this he inserted a fine wire electrode (positive pole), while he fixed the negative electrode in the form of a long plate to the servico-dorsal region of the spinal cord, and then completed the circuit. The current should be passed ten, twenty, or even thirty mins. at one sitting, and continued daily for a week after the pain had disappeared. Practice and discrimination was necessary in the application of the current. Faradization alone was worse than useless.

The CHAIRMAN, in inviting discussion, said that the Society was very much indebted to Dr. Dowse for his paper, which would be of the greatest interest to dental surgeons, especially in obscure neuralgic cases.

Mr. STORER BENNETT: I was very much interested to note, sir, amongst other things, that Dr. Dowse adopted for the first division of the fifth nerve a different treatment to that followed in the second and third divisions of the nerve. In the former case, strong doses of quinine were administered, and in the latter, bromide and iodide of potassium. There has evidently been a train of thought which has suggested these differences of treatment, and I think it will be extremely interesting to know upon what grounds this difference has been resorted to.

Dr. MITCHELL: It is important and interesting to notice in connection with affections of this nerve, that reflex action is produced not only upon the lower but also upon the upper extremities. A case in point came under my own notice; it was that of a young man badly affected with, practically, continuous neuralgia, that is to say, the pain would last for several hours, and with very slight intermission recur again for several hours, and so on for two or three weeks. All treatment was unavailing. The pain seemed to originate in the centre of the ear, pass down the neck, and the right arm. The pain was so severe as to interfere with his rest. He came to me thinking that the trouble might be of dental origin. Upon examination, I found no evidence of dental caries, but there was an unerupted lower wisdom tooth to which I could alone attribute the mischief. Local applications gave no relief, and eventually I decided to cut down and remove the unerupted tooth, with the result that not simply relief was given, but a complete cure effected; thus showing that the pain was entirely due to peripheral irritation. I had another case in which peripheral irritation produced the locomotor ataxy spoken of. It was an extremely severe case, the slightest thing being sufficient to create the lightning-like pains. This was due to the condition of the dental organs. Many of the teeth were beyond treatment, and their removal had effected a cure, but it was some time before the pain subsided—not entirely until four or six weeks after extraction. This is the most remarkable case of fulgurating pains that I have seen recorded.

Mr. GADDES: Sir, I think the able paper which we have had the benefit of listening to will do considerable service to our profession

of dental surgery. The relation which Dr. Dowse has pointed out as existing between sclerosis and affections of branches of the fifth nerve has, no doubt, a direct application in our daily practice; for, as he has shown us, the removal of the teeth, as being the seat of pain, would not be the right treatment. I think the more we can recognise the conditions of sclerosis, which are associated with these forms of neuralgia, the better shall we perform our functions as dental surgeons. From that aspect of the question we are deeply indebted to Dr. Dowse for his valuable paper.

Mr. NEWLAND PEDLEY: I should like to mention a case which illustrates the evils of extraction. It was a very marked case in Guy's Hospital, the patient being a boy, and it occurred just before the death of Dr. Moxon. I went to see the patient, who insisted upon extraction, and in a weak moment, against my better judgment, I extracted one tooth; there was nothing the matter with it, and I was very vexed with myself for having given way. I was afterwards called in again when the boy was very anxious to have several other teeth removed, but I refused to make any further extractions. The boy then took the matter into his own hands and removed them himself with a pair of scissors. The teeth bear the marks of the scissors, showing that considerable force was used. I reported the matter to Dr. Moxon, lest he should think I had in any way been a party to these extractions, and he was satisfied that the boy had acted under a misguided impression, and at the post-mortem a cerebral abscess was found. One other case I may be allowed to instance in support of the fact that stretching a nerve may give great relief, if not effect a permanent cure. About twelve months ago last Christmas, a lady came to me with an affection of the lingual gustatory nerve; it was stretched, and now she is free from pain and has been since the operation. Whether a complete cure has been effected remains to be seen, but so far she has had no recurrence of pain.

Mr. HERN: Dr. Dowse remarked upon the importance of examining the eyes of our patients before we undertake any important operations. That was impressed upon me a short time since. A man came to the hospital with anæsthesia of the right fifth nerve. I perceived this, but failed to observe on the occasion any inequality of the pupils. The tooth complained of was very much worn down, and I thought the pain might be caused by it. I therefore decided to remove it. This did not give relief, and the



man came again shortly after, wishing to have the next tooth removed. Mr. Bennett also saw the case, and we then noticed that there was some inequality of the right pupil of the patient. We sent him to Mr. Laing, the ophthalmic surgeon, and I think Mr. Laing sent him to Dr. Ferrier; and it is the case which Dr. Ferrier has recently published.

Mr. J. SMITH-TURNER: We can scarcely approach such a paper as this in a controversial spirit, so that I think the least return and the kindest return we can make to Dr. Dowse for his very valuable and interesting paper is to tell him anything we may know which may prove interesting to him. In thinking over one or two cases of loco-motor ataxy, I was quite unable to associate any dental mischief with them, but I remember now a case which may be interesting. It was some disturbance from a lower wisdom tooth. I extracted it. I think there had been some previous attempt to extract it. The gentleman was brought up from the country to me. He had got into a frame of mind spoken of as hysterical, and I was disposed to be angry with him. He had not made an advance of more than a few steps in my surgery when his father and brother, who accompanied him, made a rush for him, and it was evident he was about to fall. This failure of locomotion was one of the symptoms which I was told were an accompaniment of his trouble. I was disposed at the time to regard them as hysterical; but what I have heard to-night rather leads me to a different conclusion.

Mr. PATERSON: I should like to mention a case of spasm of the lower jaw occurring in a railway guard, who met with an accident. The affection of the jaw first showed itself ten months after the accident. The interest of the case is this: the man had been elevating his own teeth with a bone spatula until he levered out the whole of the front teeth of the upper jaw. The spasms were not at all improved by this mode of treatment, but the bite was so altered by it that he was in the process of biting his own nose off; considerable ulceration of the upper lip ensued and this intensified the condition of spasm. It was with some difficulty that I took a model, and I was only able to do so with the assistance of chloroform. I made a small plate which covered the lip and kept the jaw in proper balance. This took the biting off the ulcer and resulted in great benefit to the spasms. This was about a year since, and when I saw him recently, although they were still present, the spasms were much less severe. Bromide of potassium seemed to be the drug which gave

him the greatest relief. There is one other point I should like to mention: Dr. Dowse referred to "tendon reflex." I should like to ask whether it is a proved fact that the absence of "tendon reflex" is an invariable indication of affection of the fifth nerve?

Dr. DOWSE, in reply, said: I am extremely obliged to you for having listened so patiently to my paper. I thank you for having given me such information as you could. There are only two gentlemen, I think, who have asked questions. One question was with reference to giving quinine in neuralgia of the infra-orbital nerve. The reason, and the only reason, is that the affections of the fifth nerve are frequently due to malarial influences. If it is, and the aching comes on at stated periods of the day, we then come to the conclusion that the condition is due more or less to malarial origin, and therefore quinine is particularly valuable in these conditions. With regard to the use of iodide of potassium, it is rather a long story. We know that gelsemium acts as a specific in certain cases. With regard to the medulla tendon reflex, it is perfectly true that in individuals who are otherwise perfectly healthy there may be an absence of tendon reflex. It has been statistically proved in the German army that in 1 per cent. of healthy men there is an absence of tendon reflex.

After the usual votes of thanks the Society adjourned until May 7th.

### ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

THE Annual General Meeting of the Society was held in Edinburgh, on the 13th March, W. WILLIAMSON, M.D., President, in the chair.

The office-bearers were re-elected for the ensuing year.

The TREASURER handed in his report, which showed an income of £29 8s. and a balance of £3 18s. 3½d. in hand.

Mr. PATRICK WALKER (Dundee) exhibited a No. 7 S.S.W. handpiece, showing an arrangement to arrest its tendency to revolve, a movement especially unpleasant when the mallet is attached. A bolt had been very neatly fixed to the swivel point, and a stop peg to the handpiece. When the bolt was pushed forward it caught upon the peg, and the revolution of the handpiece thus prevented.

Mr. WALKER also exhibited photographs of the "Hastie" engine as applied for workroom purposes, driving the polishing and grinding

lathes, &c.; and also of the Webber pulley and 4 feet "poised" cable and sheath, for the ordinary purposes of the dental engine, driven by the same motor, the valve of which was controlled by a system somewhat resembling that of railway signalling. The weight of an ordinary cable and sheath, with a No. 6 handpiece on an S.S.W. engine, was 7 ozs., or, in the hand,  $3\frac{3}{4}$ . This he contrasted with the poised 4 feet cable and sheath, which, with a No. 7 handpiece, weighed 12 ozs., and, in the hand,  $1\frac{3}{4}$ .

Mr. CAMPBELL said it was unnecessary for him to speak much upon this subject, as they were all by this time pretty well aware of his views. He had seen and admired the simple and efficient method Mr. Walker had adopted for conveying power to his surgery, produced by the water-motor in an adjoining room by means of a wheel and pulley, and a cord running along the lower part of the cornice. This they would see in the photographs attached to the poised cable over the operating chair.

Mr. DURWARD said that, after being accustomed to the use of the Hastie motor for the last six months, he finds that it would be almost impossible to get on without it, and would have no hesitation in advising all members of the profession, if they want comfort in filling operations, to invest in one, and, he would also add, a Greenfield's stool as well.

Mr. G. W. WATSON exhibited two photo-micrographs taken with 1-15th inch oil immersion lens. The first one demonstrated very well the numerous organisms present in a dirty mouth—micrococci, bacilli, spirilla, and bacteria being well shown. The second showed a portion of carious dentine, the tubules being distended and packed with micrococci. Two other micrographs were also exhibited, taken with lower powers, demonstrating a well marked growth of *leptothrix buccalis* upon a small portion of carious dentine.

Dr. SMITH asked if Mr. Watson had ever seen any of the smaller spirilla in diseased dental structures, as had been alluded to in a recent lecture by Professor Cossar Ewart.

Mr. WATSON had not seen spirilla in the distended tubules, but could readily understand that they might occasionally be found there.

#### CLEFT PALATE AND ARTIFICIAL VELUM.

By Mr. J. A. BIGGS, L.D.S.Glas.

The case I bring before you on this occasion is one of congenital cleft palate. I may, in passing, tell you that staphyloraphy had been

performed on this patient on two successive occasions without any benefit to her whatever. The young lady, æt. 21, is the daughter of a physician of about thirty years' standing in Glasgow. There is no history of any similar tendency in her family. Staphyloraphy having proved a failure on two occasions on which it was performed, you can readily realise that there was a considerable dubiety in the minds of her parents as to the advisability of again calling in the aid of science; but having reached maturity, with this deformity preventing her from making herself intelligible to any but her immediate relations, they ultimately came to the determination to make one more venture on her behalf, to which determination they were aided by the late Dr. Hugh Miller, who advised that she be placed in my hands, with the view of making her an artificial velum.

On examination, I found she had a small contracted superior maxilla, containing nothing worth retaining except the two wisdom teeth; the first bicuspid on the right, and a remnant of the corresponding tooth on the left. The wisdom teeth were small, malformed, almost useless things, and the ravages made upon the left bicuspid by decay rendered it difficult to make much use of it, so that the upper right was all that could be relied on for the purpose of retaining a denture in the mouth. I did not remove a single root, but cut the crown level with the gum; then I made a ferrule to fit the decayed bicuspid, and, after thoroughly filling the root, forced the ferrule up over it, up to and below the gum, and then filled it up with amalgam, and thus made it a good serviceable anchor. I also enlarged the nerve canal of the upper central incisor for the purpose of introducing a pivot, which would thoroughly prevent any unsteadiness anteriorly in the denture. The fissure ran from the pharyngeal walls forward to about one inch and an eighth from the alveolar borders, or opposite the second bicuspid teeth, at which part the width of the fissure was three-eighths of an inch, and gradually widening towards the divided uvula, the two halves of which were about five-eighths of an inch apart; and behind, from the tensor palati of the left to that of the right, was about an inch and a-half, and from the pharyngeal wall to the uvula, about three-quarters of an inch. The anterior and posterior nares were in full view; and also the vomer and the inferior and superior turbinated bones.

I took an ordinary impression tray and some modelling composition, and procured an impression of the hard palate, reaching back as far as possible, but not allowing the material to flow into the



fissure. I then struck up a very light impression tray from block tin, and soldered a handle to it; then added a tray of gutta-percha to its extremity. I then filled with plaster of Paris, placed a wire in the root of the central, and then introduced the plaster. I may here mention that the patient is very delicate, and owing to great sensitiveness, retching was easily provoked. I had to administer stimulants to keep her together, and also to paint the fauces, &c., with dilute phenol sodique, to abate the sensitiveness and retching.

When this plaster impression was set, I removed it, then cut a hole in the tray, containing the plaster impression; and through this I introduced an India-rubber tube, soaped the surface, and returned it to the mouth. An assistant held it in position there. I then pushed the nozzle of a syringe into the end of the tube, and withdrew the plunger. Another assistant had plaster mixed with potass alum ready. This was poured into the syringe, the plunger was replaced, and the plaster injected into the fissures; then I withdrew the first part of the impression; and with good strong tweezers pushed the other part backwards as if down the throat.

Both halves of the impression were then placed in situation and then cast, and, to facilitate the getting at either side, the model was also taken in two parts. The model was then steamed, and the fissure filled, and an impression in sand taken, and thus Babbitt metal models secured, on which a gold plate was swaged; bands fitted to the bicusps, and light wires encircling the wisdom teeth, and a wire soldered into the plate, to fit into the left central incisor.

The six front teeth were fitted and backed, and at this stage the whole was fitted into the mouth, and found most satisfactory; they were then soldered and tried upon the model, but the plate, from some cause or other, was very badly warped. Probably the assistant had used too heavy an investment—that is, an excess of material, causing a twist that was retained by the solder. This was somewhat disheartening, because, with the teeth bands and pivot, it became a difficult matter to recover the fit. There, however, were only two ways for it—either to make a new one or to re-strike that one up again. I chose the latter plan, and proceeded thus:—I placed an iron wire in the pivot root, made up a mixture of asbestos, fireclay, and plaster of Paris, soaped the model, and took an impression, dried, and cast in Babbitt metal.

The pin was easily withdrawn, having been coated with whiting. The front part of the model was covered with fireclay, asbestos, and

plaster of Paris, dried, and the lead poured over. This formed a chamber over the teeth and bands of the plate. So the plate, with teeth bands, pivot included, was restruck, and the fit restored. I have gone into detail, which may seem tedious to some; but I thought it might be interesting to others, and also instructive to those who did not know of this method, and therefore useful to them if a like contingency should be met with in their practice.

The bicuspid and molars of the lower jaw were all so irretrievably lost that for the present no cognisance was taken of them, and vulcanite blocks were rivetted on the plate as substitutes for the bicuspid and molars.

Holes were now punched in the palate of the gold plate, and a small piece of gold fitted to it, to which two gold screws were soldered, having small nuts working freely upon them. The object of this was to secure a hinge, also of gold, to which was attached the artificial velum. There is a small portion of the fissure covered by the anterior part of the hinge. This was mounted with rubber to act as an obturator. To the posterior portion of the hinge was adapted the artificial velum. At first my intention was to make this part in soft rubber, but further consideration made me determine to construct it in hard rubber. I believe that far better results may be obtained from soft rubber than is usual if it be packed in a tin mould, and vulcanized in dry heat, as obtained by the new-mode heater. There is, as on cast metal, an impermeable skin compared with vulcanite cooked in steam. But the best cooked soft rubber will not wear so well as plain hard rubber, and will require renewing from time to time. For that reason I determined to make it of hard rubber, which I proceeded to do thus:—I attached the hinge to the plate, placed it on the model, softened in boiling water some gutta-percha, and modelled up the velum. This I cooled and tried in the mouth, and, after some slight adjusting, I was satisfied with its position and its adaptation. Owing to the difficulty of packing it, it was flaked, so that the side parts were capable of being removed like cores, but it was found unnecessary to make use of them practically.

When the velum was finished, it was attached to the plate by the screws and nuts, and tried in the mouth, and the necessary pitch obtained by the raising of the stop pin. This, as you observe, is a contrivance for taking the weight of the case off the muscles when at rest. You will observe that part of it lies above the natural velum and part below; so that when the uvula is raised or depressed, the

artificial velum is carried along with it, and thus fulfilling physiologically the purpose for which it was constructed.

I need not point out to you the great difficulties to be overcome by the patient, even after all that is possible has been done. A patient with a congenital cleft of the palate has never been able to pronounce distinctly any words, and but few sounds. Therefore, after the introduction of such an instrument, it requires an actual course of training to teach them to pronounce sounds they have never learned to do before, and this patient is no exception to the rule. There is, however, a marked improvement in her capacity to utter sounds, and even already she has learned to repeat sounds she could not imitate at all before. She has only worn the plate and artificial velum a fortnight, and it took the best part of that time to familiarize her with it.

Since writing this paper, I find one of my statements to have been incorrect. The patient's mother, who has been completely invalidated for over ten years, had a cousin who also had a congenital cleft of the palate.

Mr. Biggs illustrated his paper at its successive stages by exhibiting the models and apparatus treated of in the text, and then introduced the patient, who kindly allowed an examination of her mouth to be made by those present; and, to demonstrate the effect of the palate and velum, her speech and articulation were tested, firstly without and afterwards with the palate *in situ*.

Dr. SMITH said the case was one of considerable interest, and had been ably treated by Mr. Biggs. With regard to the improvement in speaking after an obturator was fitted to the parts, it sometimes occurred that for days after the patient began to wear it the speech, instead of being improved, was positively worse and more difficult. This was owing to the foreign body at the back of the palate; but it soon passed off, as the wearer became accustomed to its presence. The patient had only worn it a fortnight, and, considering this, he thought she spoke very well.

Mr. CAMPBELL had had some experience in making obturators, but they did not have the same interest to him now as formerly. He was pleased, however, to see the interest and zeal displayed by Mr. Biggs in this difficult case, and congratulated him on the successful manner in which, by his mechanical ingenuity, he had overcome all difficulties in constructing this artificial velum.

Mr. MACLEOD added his testimony to the very evident care and thought Mr. Biggs had shown in the construction of the palate and velum, and spoke highly of the excellent and perfect design and workmanship.

The PRESIDENT thought that it was scarcely fair to judge of the speaking powers of the patient at so early a stage, and while the velum still required some slight remodelling to completely close the gap. The muscles of the cleft soft palate hardly seemed sufficient to raise the velum, which, though beautifully modelled in the hard rubber, appeared too heavy for the lifting force at command. He was inclined to think that Suersen's obturator would give equally satisfactory results. The case altogether was a very interesting one, and he had very great pleasure in moving a vote of thanks to Mr. Biggs.

Mr. MACLEOD said that, when over in America last August, there were two things which took his fancy as illustrating the ingenuity of their American *confrères* in utilising ideas, and the patient, painstaking manner in which they elaborated details and finish in their tools. These two things he now had the pleasure of introducing to the notice of the society—viz., Knapp's Nitrous Oxide Blowpipe and Rishel's Automatic Vulcaniser. The first was perfect in its way, and would be found most useful in the laboratory where the dentist did the finer parts of his metal work. In our own country, Mr. Hunt, of Yeovil, had 19 years ago utilised  $N_2O$  in melting, soldering, &c.; but to Dr. Knapp belongs the merit of devising and constructing a most ingenious, elegant and simple apparatus for its convenient and economical use. Mr. Macleod demonstrated its power.

*The following extract is from a published paper on Nitrous Oxide.*

*Yeovil, Feb., 1869.*

To men who are often obliged to melt their own gold scraps for making gold plate, I thought some discoveries of mine would be useful, so many being in the possession of the apparatus for making nitrous oxide.

After experiments with this gas as a convenient substitute for oxygen, used as a blast through the flame of spirit lamp on a ball of lime for obtaining a brilliant white light in the mouth, I thought I might use the flame for heating purposes, as it would probably be *intense*, and also well *under command*. I found it so answered my



expectations that I could easily run down a couple of ounces of 18-carat gold; and from the ease of melting, I concluded I could readily melt a much larger quantity.

I then substituted for the flame of a spirit lamp a Bunsen's gas jet, which I made to burn horizontally. An ordinary blowpipe was introduced into the middle of the gas jet, connected by elastic tubing with my gasometer; weights were placed on the top of the gasometer to compress the gas.

On turning on the gases, the mixture of coal gas  $\text{NO}_2$ , produced a small, conical, pale white flame, before which gold runs down like wax. I considered this jet valuable also in oxidising any impurities in the gold, which I melted upon charcoal. I found the quantity of nitrous oxide consumed trifling.

The above is an extract of a paper of mine published in the *British Journal of Dental Science*, March, 1869. This was before the days of liquid gas; and now results can be obtained better by having as much pressure as you want, and also by the union of coal gas and nitrous oxide *within* the jet just before the gases issue, thus obtaining better combustion in the Knapp blowpipe from the results I obtained so many years ago. I have the highest opinion of this blowpipe for practical purposes in the hands of dentists.—Pen Villa, Yeovil, March 10, 1888.—W. A. Hunt, L.R.C.P.Lond., &c.

The Rishel Vulcaniser, which automatically closed the flasks when the rough-packed rubber was at its softest, and thus secured immunity from cracked blocks or displaced teeth, was also a very ingenious and compact instrument. It consisted of an outer chamber for the generation of steam, the upper part of which was contracted by an annular swell and rubber washer. In this outer chamber was a hollow piston chamber in which the flasks were placed unclosed. The generation of steam in the outer chamber forced the piston chamber upwards, bringing the flasks in *pressed* contact with the floor of lid of the vulcaniser, and closing them most effectually. To properly understand the working of this machine, diagrammatic illustrations are required, which may be found in some of the dental journals or had from the Welch Dental Co., Philadelphia, U.S. Mr. Macleod pointed out a weakness in the present issue of the "Rishel"—viz., the thinness of the bottom of the piston chamber, which rendered it liable to bulging in the event of the safety disc of the outer chamber giving way. He also suggested

that it would be much improved by the attachment of a steam gauge.

The PRESIDENT hoped that Mr. Macleod would next session report further on Rishel's vulcanizer and Knapp's blowpipe as to their real practical value in the workroom.

Mr. G. W. WATSON then read a paper upon

#### EMPHYEMA OF THE ANTRUM.

At the January Meeting of our Society, Dr. Smith made some remarks in regard to ozæna, and gave it as his opinion that this condition was more frequently than is suspected the result of a pathological condition of the maxillary sinus consequent on the presence in the jaw of diseased teeth ; which opinion exactly coincides with my own, two cases which I am about to bring before your notice bearing strongly on this point.

CASE I.—Some 18 months ago a gentleman called on me complaining of toothache. The tooth referred to had quite a superficial cavity in it, which I filled ; but, on examining his mouth, I found that he had several abscessed teeth in the upper jaw, and noticed a peculiar odour, which I knew to associate with antral or nasal trouble. I asked him if there was anything wrong with him. He acknowledged that he had been suffering from a discharge of pus from the right nostril, accompanied by severe frontal headache for 18 months, and had been under treatment by an expert, who had, however, done no good. He had also consulted two experts in London, one of whom diagnosed the case to be one of ozæna ; the other said there was a tumour in the frontal sinus, which was the origin of the trouble, and would require to be removed. After a careful examination, I came to the conclusion that it was a case of antral empyema, and told him that I thought he could be put all right if he allowed me to remove all the diseased teeth in the upper jaw and make an opening into the antrum. After having consulted his friends and medical attendant, he agreed to be operated on. The condition of patient previous to operation was this :—

Great depression of spirits, severe frontal headache, which was almost constant, the parts over the frontal sinus and superciliary ridges were painful to the touch, and there was a copious discharge of a muco purulent fluid from right nostril, so much so that if he stooped a drop would fall from his nose ; while the odour coming from him was perfectly overpowering, and the sense of smell had

almost entirely gone. The patient attributed his condition to a severe chill caught while travelling to London. In presence of his medical attendant, I gave the patient a full dose of nitrous oxide, and removed the first upper bicuspid and molar on the right side, and two teeth on other side also, and made a free opening into the antrum through the socket of the first pre-molar, which I found communicated with the antrum. As a confirmation of my diagnosis, a flow of pus was obtained from the antrum on opening into it, and on syringing the fluid passed quite freely through the middle meatus into the nose. I moulded a portion of gutta-percha round a piece of iron binding wire, and used this as a temporary plug for the opening into antrum, till a proper silver drainage tube could be made. The patient was instructed to wash out the antrum thrice daily with a hot saturated solution of boracic acid. In the course of a fortnight the frontal headache had almost gone, and patient felt very much better in every respect. The patient was told that in all probability it would be a year before he was all right again, and such was the case. In two or three months the pain in region of frontal sinus had entirely disappeared, recurring again slightly later on as a result of nasal catarrh. The syringing of antrum daily, either with solution of zinc chloride or boracic acid, gradually brought the mucus membrane into a healthy condition and a subsidence of the discharge, and about the end of the year of treatment I removed the drainage tube, and the opening into the antrum closed up in the course of two or three days. At present time, six months since the completion of case, the patient is in perfect health. I have no doubt that the abscessed teeth were the origin of all those symptoms, causing, in the first place, irritation, then inflammation and alteration of secretion in mucus membrane of antrum, and the extension of this inflammatory condition to the nasal membrane, both from continuity of surface and the passage over it of the irritating purulent discharge from the antrum. The pain experienced in the region of frontal sinus, and which no doubt misled the London expert in his diagnosis, was, I have no doubt, purely reflex. The most instructive part of the case is, that none of the medical gentlemen ever suspected or even looked at the teeth to see what condition they were in.

CASE 2. History.—The patient was a clerk, æt. 42, of rather a delicate appearance. At beginning of last July he was suffering very much from toothache in the upper jaw, and a feeling as if he

had caught cold. He went one evening to a flower show, returning home on the top of a tramcar. Next day he had a severe rigour, was very sick, and vomited frequently, the illness culminating in nasal and gastric catarrh. This illness lasted for about a month, during which he was attended by his doctor. The right eye became swollen, and was useless for three or four weeks, and the right nostril was blocked by secretion, and continued so till he came into my hands some months later. His doctor took him to an expert in August, as no good had been obtained from douching the nasal cavity. He diagnosed the case to be one of ozæna, and said there was also diseased bones in right nasal cavity, and recommended patient to continue syringing the nose with boric solution. He was sent to the country for change of air, and remained away about a month. On his return it was found that matters were still in the same condition, the right nostril quite closed, and a constant discharge of a muco-purulent fluid, accompanied by the usual powerful odour. A week or two after this, the expert noticed a slight bulge of the cheek on right side, and thinking the antrum might have something to do with the condition of matters, told him to call on me. This was on October 22nd. In passing, I may say that the patient himself suggested to the doctor that the teeth might have something to do with it, as they had been so troublesome; but he always pooh-poohed the idea. On examining the patient, I saw it was a case of antral empyema, consequent on the presence in the jaw of abscessed teeth. Next day, in presence of his doctor, I gave patient a deep dose of nitrous oxide, and removed the second upper bicuspid and first and second molars on the right side, and on a subsequent occasion two teeth on left side, and made a free opening into the antrum through the socket of the second pre-molar. On attempting to syringe out the antrum, I found that for a considerable time nothing would come; but eventually, after using very great force with the ball syringe, a tablespoonful of caseous-looking purulent secretion came away from nostril, some of it of a blackish colour from pigmentation. In spite of this only a small stream of the injected fluid could be forced through the antrum and nose, and he could not breathe through the nostril. However, at eight o'clock the same evening, he managed to do so for the first time for months. On passing a probe into the antrum, I could detect bare bone on its nasal wall. A silver drainage tube was put through, the opening into antrum being kept in position by a piece of thin gold wire



round the first pre-molar, and patient was instructed to syringe through the tube with saturated solution of boric acid thrice daily, keeping the tube closed with a plug of cotton wool in the intervals. Next day a piece of dead bone about the size of a small finger nail came away from the nostril while syringing, and since then several small fragments have been removed by the same means.

After using boric solution for three or four weeks with great advantage, I told him to use zinc chloride, two grains to the ounce to begin with twice daily, and the boric solution once; under which treatment and the use of tonics he has rapidly improved, and at the present time (March) the secretion has become very much less, the patient being able to do with one handkerchief per day, when he used to require a dozen. The nostril is quite free and there is no indication of diseased bone, the odour also being very much less. I took a photo-micrograph of a small portion of the caseous pus that came away after opening into and syringing the antrum. This I now hand round. It swarms with micrococci and bacilli. As the case went on, I made periodical microscopical examinations of the secretion, antrum and nose, and found that there were fewer of these organisms each time I examined, and also less of the pus cell, and more of the normal mucous elements present. This patient was shown to the members.

I may say that I have had other two cases during the year—one where the disease had been going on for five years, the true origin of which, however, had been overlooked by several medical practitioners whom he had consulted. He was put all right, after being treated for about three months. The other case was the work of an unqualified practitioner, filling a canine tooth over an exposed pulp.

In conclusion, I would urge upon all who come across such cases the thorough examination of the mouth, the removal of all abscessed teeth, and the filling of all those that require it.

Dr. SMITH said that Mr. Watson's cases were very instructive as typical instances of this affection. It was difficult to open the antrum, as a general rule, through the socket of any tooth anterior to the second bicuspid, because there the floor of the antrum did not sink so low as above the molar teeth. Where pus was discharged at once upon the extraction of an upper molar, it did not always imply that the apex of the fang had penetrated into the antrum. It was more likely that pus had been secreted between the bone and the strong periosteum and mucous membrane covering the interior of that cavity

—which often occurred in the same manner as in sub-pericranial abscess. The opening of the maxillary sinus into the middle meatus was one of a nature very apt to become obstructed, as was shown in one of Mr. Watson's cases. It was in these cases that the antrum began to bulge, and in which most pain was felt. Perforation of the antrum might be performed either through the socket of a tooth, or by removing a portion of the outer wall above the alveolar ridge, or as Miculicz proposes, from the inferior meatus, but this last was occasionally difficult. Opening into the antrum was not invariably required, however, in cases of discharge from that cavity, if it came away freely by the nose; as in many of these cases it arose from the irritation set up by diseased teeth, which being removed, the other symptoms disappeared. Sometimes the irritation extended from the antrum to the other sinuses in connection with the nasal cavity, by the mere continuity of the lining membrane, and upon removal of the antral affection these became improved also. It was not necessary that the teeth occasioning antral disorders should be the teeth more immediately connected with that cavity, as he had seen several cases where antral discharges had seemed to depend upon teeth situated in the front of the mouth. The closing of the opening made in perforating the antrum, in whatever way it was done, varied considerably in the time it took to become obliterated. It was probably in the cases which had been alluded to, where the pus was situated between the bone and periosteum, and where necrosis was likely to occur, that the most marked foetor of the discharge existed, and where the closure of any opening made was more protracted.

Mr. CAMPBELL said that some years ago a lady patient who had been under Mr. Watson's treatment for disease of the antrum came to reside in Dundee. Mr. Watson had sent him a full description of the case and requested the lady to put herself under his care. He merely continued the same treatment, or rather requested the patient to continue syringing as she had been doing, showing herself from time to time, that the progress of healing might be ascertained. In two or three months the tube was removed, and the case terminated very successfully. He had treated one or two cases on the same lines as those described by Mr. Watson, and with very satisfactory results. He considered the form of tube used by him, and the fact of having it secured to an adjoining tooth, and thus allowing free syringing without displacement, most important matters in the successful treatment of these often troublesome cases.

The PRESIDENT said the cases brought forward were extremely interesting, and showed how prone the ordinary medical practitioner was to omit the dental aspect of such cases and to fly to the various abstruse theories as to the cause of trouble. As regards the position of the opening into the antrum, the alveolus was generally the most convenient, and the use of the tube prevented premature closure. He had had a case lately of a young medical man, who had what seemed to be mucous engorgement of the antrum, dilating the outer and palatal walls. The teeth were in a satisfactory condition when first seen, but later on the pulp of the first molar became exposed from his having neglected it. The tooth was removed, and the palatal root was found very much absorbed, and the opening into the antrum was obtained through its socket. After a time the opening closed, and the antrum again filled. This time an opening was made through the external plate, at a point over the position of the second bicuspid. The patient made a very ingenious contrivance to effect drainage, and also to keep the opening patent and to allow the cavity to be syringed. He took a little bit of wire, embedding the end in gutta-percha, and placed it in the slight space between the second bicuspid and the second molar, which had moved forward. To the other end of the wire he tied a short piece of fine catheter, one end of which passed into the antrum, and the free end opened into the mouth. This appliance was perfectly comfortable, and answered every purpose. He might add that, in this case, there was no opening into the nose.

The meeting then adjourned.

### **A CASE OF LARYNGEAL SPASM UNDER NITROUS OXIDE, IN A PATIENT WITH OLD-STANDING ARTHRITIS OF THE LOWER JAW, CERVICAL VERTEBRÆ, AND OTHER PARTS; LARYNGOTOMY; REMARKS.**

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*(From the Journal of the British Dental Association.)*

THE following case came under my observation at the close of last year. I have thought fit to publish it for two reasons. In the first place, I am convinced that there is no better mode of extending our knowledge respecting the action of anæsthetics than by carefully observing and recording all peculiar and instruc-

tive cases ; and, in the following details, fresh light may, in the course of time, be thrown upon those features of the case which are at present involved in some obscurity.

On December 1st, 1887, at five p.m., I was called to administer nitrous oxide for a well-known dental surgeon in my neighbourhood. The patient was a gentleman, thirty-five years of age, who, at first sight, presented no obvious peculiarities in his appearance. He was of middle stature, well nourished, and of rather florid complexion. Subsequently, on careful examination, it was discovered that, with the exception of very slight rotatory and nutatory movements, the head was so rigidly fixed that, when the patient wished to look to the right or left, he invariably moved his body in the required direction. Most of the muscles of the neck and throat, especially those situated posteriorly, we found to be abnormally rigid, whilst in addition to the stiffness of movement which existed in the cervical region, the jaws could only be separated to about one-fourth of their normal extent.

Since the day above referred to, the patient has very kindly furnished me with full particulars of his previous health, and the following is a brief abstract of his statements. He had rheumatic fever, followed by several subacute rheumatic attacks, in 1871. Was dangerously ill with "some kind of enteric fever," in Italy, in 1873. He grew stronger in 1874, and continued to improve. In 1882 he had typhoid fever in England. In 1883 he was ill and weak with "low fever coming on every now and then." After this he grew gradually stronger, and with the exception of stiffness in most joints, not only of the extremities, but also of the trunk, he regained good general health. The stiffness in the neck muscles and inability to open the mouth beyond a certain degree were first observed in or about the year 1874. Even when he is in his usual health he can produce audible crackling in many of his joints, especially in those of the lower jaw, cervical vertebræ and wrists.

The administration of nitrous oxide on the occasion referred to was conducted in the usual manner. The operator, who was about to remove the left upper molar tooth, placed a small gag between the teeth on the right side. I applied the face-piece, and first allowed the patient to breathe air through the apparatus. Nitrous oxide was then admitted, and each expiration was allowed to escape. The phenomena which usually attend the inhalation now presented themselves, and the face-piece was removed, when



the characteristic alteration in the respiratory rhythm commenced to appear. The tooth was then without difficulty extracted, and was found to be intact. The admission of air when the face-piece was removed did not, as is usually the case, restore the respiratory rhythm. I may here mention that it is my practice to remove the face-piece and to terminate the administration when the rhythm of breathing *commences* to become impaired. The admission of air during the peculiar intermittent respiration at the end of an administration is usually sufficient to restore the normal breathing in a few seconds. But, on this occasion, the respiration after the removal of the face-piece became more and more difficult, and finally ceased, as though from some *obstructive* condition of the air passages. The reason why I emphasise the word obstructive will be subsequently seen. The sound made by the last attempt at respiration was to a certain extent suggestive of fluid at the back of the throat. My first act, therefore, was to attempt to turn the head upon its side, and to push forward the lower jaw, a procedure which in ordinary cases is almost invariably successful in re-establishing breathing, when a little blood or mucous has accumulated at the back of the pharynx. The patient, however, was in a state of extreme tonic spasm, which more particularly involved the previously rigid muscles of the throat and neck. From this cause, and from the rigidity of the cervicle spine, it was impossible to rotate the head except to a slight extent. Moreover, seeing that there was a considerable degree of fixation of the lower jaw, it was found impossible to push the latter bone forwards. I next attempted to pass my fingers to the back of the mouth, but I was unable to do so, as the aperture between the front teeth was so small. I therefore applied the tongue forceps, and made vigorous traction, but without any good effect. As a small quantity of blood from the socket of the extracted tooth had now escaped into the mouth, and as the rigidity of the patient prevented my bending his head forwards, I decided to attempt to invert him and at the same time to forcibly compress the thoracic walls. With the able assistance of my colleague this was done; but the manœuvre proved unsuccessful. The thoracic walls were absolutely immovable. I next placed the patient on the floor, and very forcibly pressed upon the sternum whilst I applied the tongue forceps as before. Respiration had now ceased (according to my estimate) for two to two-and-a-half minutes. It will be observed that I never attempted artificial

respiration (in the usual acceptation of the term), for I was sure that the unyielding rigidity of the thoracic walls, which rendered futile all our endeavours to compress them, would have rendered any more formal efforts equally nugatory. The face was livid and bloated, the lips purple, the whole body rigid, the chest motionless and fixed. There was no time, nor was it necessary, to feel the pulse. I was perfectly confident that the failure of respiration was such that, if I could successfully perform laryngotomy, recovery would almost certainly follow. I therefore asked my colleague to get the tracheotomy instruments, which I always carry, from my bag. In order to save time—for death was imminent, and every moment was precious—I employed his pocket-knife, so that whilst I was performing the operation he might be preparing the tube. I made a skin incision, and then rapidly passed the small blade of the pocket-knife into the crico-thyroid membrane. In my eagerness to gain admission to the trachea I cut either partly or wholly through the cricoid cartilage. The parts were much obscured by dark venous blood. Passing the tip of my little finger into the opening thus made, the rushing sound of entering air immediately became audible, and the tube was without difficulty introduced. I next sent for Mr. Sheild, who subsequently took charge of the case. When consciousness had returned, the patient expressed a wish to see Sir James Paget, under whose care he had formerly been; and it was not long before this wish was gratified, for Sir James was kind enough to come without delay. All super-added spasm had now completely subsided, and the patient was able to speak without difficulty. Bearing in mind the unexpected and pronounced nature of the spasmodic seizure, it was decided, after a brief consultation, to allow the tube to remain in position till next day, when it was removed by Mr. Sheild. My colleague, whose able assistance and uniform kindness I shall ever appreciate, allowed a bed to be arranged in the room in which the operation had been performed, and an equable temperature was carefully maintained throughout the night. The wound completely healed in a week's time, and the patient made an excellent and uninterrupted recovery.

In carefully considering the facts of the above case, three questions present themselves:—1. What was the nature and exact situation of the obstruction to respiration? 2. What was the cause of the spasmodic condition? 3. Could any other means, short of

laryngotomy, have been successfully adopted for the relief of the symptoms?

1. *The nature and situation of the obstruction.*—When the administration of nitrous oxide is pushed to its full extent, air being rigidly excluded, a peculiar alteration in the rhythm and amplitude of the respiratory movements almost invariably ensues. I have elsewhere\* pointed out that the intermittent and somewhat tumultuous respiration produced by a full dose of nitrous oxide is partly, if not wholly, dependent upon the spasmodic action of certain extrinsic muscles of the larynx. Towards the close of an administration of the gas, it will be found that the larynx becomes, at irregular and short intervals, drawn up, as in the act of deglutition. Every time the larynx is thus raised, its superior aperture becomes closed, partly by the epiglottis, and partly also by the action of the sphincter muscles. The alteration in respiratory rhythm is thus rendered intelligible; for, at the moment at which the larynx is raised, and its superior aperture closed, respiration becomes temporarily checked and its rhythm therefore altered. Even though nitrous oxide be pushed to an undesirable degree, the removal of the face-piece and the admission of air will, with the rarest exceptions, suffice to restore breathing. I have introduced these remarks, because they may possibly tend to throw some light upon the question now under discussion. I am not prepared to state that in the above case the obstruction was wholly occasioned in the manner just described. The occlusion may have exclusively arisen from spasm of the sphincter muscles, and the spasmodic elevation of the larynx may have played an unimportant part in the causation of the obstruction. But, whatever was the determining cause of the obstruction, two facts became apparent; firstly, that the occlusion of the air passages was of a spasmodic nature, the spasm having involved either the sphincter muscles of the larynx or the elevators of the larynx, or both; and secondly, that the supra-glottic portion of the larynx was the seat of the obstruction to respiration. There is every reason to believe that the vocal cords themselves took no active part in causing the obstruction; for there was no stridor such as that which is met with in laryngismus stridulus, or spasm of the true cords.

Taking all circumstances into consideration, it is not unreasonable to suppose that the primary difficulty in respiration was identical

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\* Trans. Odon. Soc., Vol. xix., No. 5, New Series, p. 125.

with that which usually manifests itself in a minor degree at the conclusion of an administration of nitrous oxide—a difficulty dependent upon the intermittent elevation of the larynx. Going one step further, we naturally inquire: Why did this intermittent obstruction terminate in complete occlusion of the air passages? Either the larynx must have been prevented from descending by reason of some abnormal condition in its intrinsic muscles; or the sphincter muscles of the larynx must have become affected by the most obstinate form of spasm. Whether one or both of these conditions existed it is, so far as I know, impossible to say. Moreover, we must not lose sight of the possibility of two minor conditions having contributed to the obstruction. A certain amount of venous engorgement occurs under nitrous oxide, a fact which, in a full-blooded patient, might account for a limited degree of narrowing of the superior aperture of the larynx; and, if we admit that the elevation of the larynx and the application of its superior aperture to the epiglottis was an important element in the case, it is obvious that any attempts on the part of the thoracic and abdominal muscles to overcome the obstruction would have had a deleterious effect, in consequence of the suction action upon the epiglottis which would thereby have resulted.

2. *The cause of the spasmodic condition above described.*—It is unfortunately impossible, in the present state of our knowledge concerning nitrous oxide, to say what causes operate in the production of the tonic and clonic phenomena with which all who have administered the gas must be acquainted. It is not my intention to discuss, on the present occasion, the physiological significance of these phenomena. Whatever may be the cause of the spasmodic movement which, at the termination of an administration of nitrous oxide, are prone to affect many of the muscles which are directly or indirectly concerned in the maintenance of respiration, I cannot avoid the belief that, in the above case, other and perhaps more important factors must have been at work. There would seem to be reasonable grounds for the hypothesis that a patient whose throat and neck muscles had undergone certain changes by reason of the restricted movements in the articulations of the jaws and vertebræ might be peculiarly affected by the ordinary dose of nitrous oxide. A certain degree of hypertrophy was probably present in some muscles, whilst in others the opposite nutritive condition doubtless existed. It is a noteworthy fact that



the spasm which produced the stoppage of respiration was of a most pronounced character. Granted that the initial or predisposing cause of the seizure was the presence of nitrous oxide in the circulation, I cannot but think that some other more potent cause subsequently came into operation. In the absence of more tangible reasons, I am therefore inclined to regard the intense spasm which rapidly supervened as connected in some way or another with the abnormal arrangement or condition of the muscles of the throat and neck already referred to.

3.—*The treatment adopted.*—The usual methods of restoring respiration were, as I have described, fully tried. One of the most remarkable features of the case was the extreme rigidity of all the muscles of the neck and chest, so that all attempts to push the lower jaw forwards or to compress the thorax were unsuccessful. It may not be out of place, in this connection, to point out the great difference between failure of respiration from some obstruction in the air passages and failure from paralytic causes. In the latter condition, when uncomplicated, artificial respiration will in a few moments restore respiration, because air may be readily forced into and out of the chest. In the former condition it is obviously useless to attempt to systematically perform artificial respiration, but the attention should be directed towards the removal of the obstruction. Traction upon the tongue, which is usually successful in restoring breathing which has ceased in consequence of obstruction at the superior aperture, was vigorously tried, but without good effect. Had it been practicable to have opened the mouth widely, it is possible that the obstruction might have been overcome by hooking forward the epiglottis and separating the approximated sides of the superior aperture of the larynx with the finger; but such a procedure was unfortunately out of the question by reason of the partial ankylosis of the lower jaw. Artificial respiration, in the usual sense of the term, was, for obvious reasons, useless; and forcible compression of the chest completely failed to drive anything past the obstruction. Laryngotomy was, therefore, the only remedy left, and, as I have already described, this measure was completely successful.

It is extremely rare for any emergency to arise under nitrous oxide, and a prolonged acquaintance with the anæsthetic has proved that, in experienced hands, the danger of life incurred by its administration is so infinitesimal that it may be disregarded.

Still, as the above case has shown, we must be ever on the alert and ready to cope with any difficulties that may arise. Had the patient not been the subject of the peculiar condition of the neck and throat above described, it is in the highest degree probable that no serious effects would have been produced by nitrous oxide. Were I to be asked, on some future occasion, to anæsthetise a similar patient, I should either prefer to induce very slight anæsthesia with nitrous oxide, and then proceed to administer ether vapour till the required degree of narcosis had become established, or I should administer ether alone. So far as I can ascertain, no similar case has hitherto occurred; and I therefore trust that the above details may help to add to our knowledge respecting an anæsthetic whose advantages are so universally appreciated.

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### CUNNINGHAM v. WHITTLES.

THIS case was heard on the 14th ult., before Mr. Justice Kekewich, in the Chancery Division of the High Court of Justice, and was an action for infringement of copyright under the Act 5th & 6th Vict., cap. 45, commonly known as the "Book Act."

Dr. George Cunningham, D.M.D., B.A., L.D.S.Eng., Lecturer at the National Dental College, and practising in Cambridge, the plaintiff in the action, is the author of a work entitled "A Suggested System of Dental Notation," which contains special diagrams of teeth of his own design, and Dr. Cunningham claims that his system is of great value to dentists in enabling them to keep a careful record of the work done to a patient's teeth. The defendant, a chemist and druggist established in Birmingham, had caused to be printed and published a material part of the book, and had registered it in the books of the Stationers' Company in his own name, as being the author of it, under the title of "Whittle's Dental Register."

Mr. Justice Kekewich granted a perpetual injunction restraining the defendant from printing, publishing or selling the plaintiff's book or any part thereof, and made an order to expunge from the books of the Stationers' Company the entry that had been made therein by the defendant. The learned Judge further ordered the defendant to make an affidavit giving particulars of all the printed matter he had caused to be printed having reference to the plaintiff's work, and also the names and addresses of the printers and of all persons to whom any circulars or parts of the book had been sent,

and to deliver up all copies, or parts of copies, of the plaintiff's work in his possession or in that of his agents, and that the plaintiff should receive the sum of money paid into court by the defendant, together with the costs in the action as agreed between the parties.

Mr. John Gretton, instructed by Mr. C. R. A. Edmonds, appeared for the plaintiff and Mr. Charles William Bardswell, instructed by Messrs. Jaques, for the defendant.

### THE LEAST AND SIMPLEST FORMS OF LIFE.

THE Rev. Dr. Dallinger, President of the Royal Microscopical Society, recently gave a short series of lectures at the Royal Institution upon "Microscopical Work with Recent Lenses on the Least and Simplest Forms of Life." The lecturer graphically described the appearance of a putrescent fluid under an extremely powerful lens, in which the common forms of the sphæro, rod-like and spiral bacteria occur in such numbers that he endeavoured to give some idea of their minuteness by declaring that in a ten-thousandth part of a cubic inch a number equal to the members of a hundred million solar systems could exist. Putrescence, or saprophytic fermentation is not, however, carried on throughout by any one organism, but a number of nearly allied organisms successively carry on the process at different stages. The number of these organisms appear to be about ten, eight of which have been recognised and their life-history more or less ascertained, though one or two of the number appear generally during putrefaction only in tropical or sub-tropical zones, and but rarely when the temperature is high in more temperate climates.

The *Bacterium Termo* always appears in the first stage of decomposition of animal matter, and is also present in the last. As it is capable when supplied with a suitable pabulum of reproducing itself by fissure every three minutes, it soon attains considerable numerical prominence. Simultaneously with the appearance of the next organism, the spirillum, an evolution of noxious gases, is noticeable. These bacteria have a sinuous snake-like motion, by means of which they bore their way through their food, completely riddling it with minute holes, and thus leaving it in a state in which the peculiar motion of the next organism will have the greatest disintegrating influence. The motion of this organism was compared to that of a ball rolling in its socket, the latter being

represented by the food material. The form which next appears is more energetic in its action and is furnished with two hooked flagella, the longer of which it employs to anchor itself to the solid matter, whilst it plunges the shorter one into the mass by a series of bounds and rebounds, the curved end tearing up the substance at each stroke. Other forms are supplied with three or even six flagella. These latter forms occur more especially among the sediments at the bottom of putrescent fluids. The general modes of reproduction of these organisms is both asexually and sexually. The asexual mode of reproduction is accomplished by a constriction occurring in the centre of the organism whilst the cilia at the same time split. This constriction continues until the two halves, which increase in size, are only joined by a filament so delicate as to be ruptured by a sudden movement, when they are rendered completely independent of each other and each forms a mature organism capable of further reproduction. This process is accomplished every three or four minutes, but after a time becomes slower and finally stops, and further reproduction is only possible by the sexual method. Two of the organisms in close vicinity then adhere to each other, one being superimposed upon the other; the lower one absorbs the contents of the upper, becomes of an irregular shape and filled with minute bodies which swell, burst the sac and disperse. These minute bodies, at first semi-opaque, increase in size, become transparent, and growth of cilia takes place.

The introduction of homogeneous lenses some years ago, in which a fluid medium of requisite refractive index was made to replace the air between the glasses, gave a great impetus to researches on the minute forms of life, but the disadvantages that such a type of lens naturally possessed led to the acknowledgment of the requirement of glass of much higher refractive and dispersive power to replace them. The perseverance of makers, especially in Germany, had led to such success in this respect that he (Dr. Dallinger) had been enabled to determine not only that the nuclei of the saprophytic organisms play an important part in their reproduction, but the nature of the changes that occur in their nuclei. The spores which are liberated from the sac in sexual reproduction rapidly increase in size, but after a time the nucleus pauses, although the outer film of protoplasm continues to increase. During this pause the nucleus develops a granular structure internally, and flagella are seen to arise from it and push their way out, the process only occupying about twenty minutes. The fissural divisions are



observed to commence in the nucleus, which at first has a pleuxus-like structure all over, but subsequently clears; the pleuxus-like appearance being then confined to two lobes at one end, whilst a beaded line runs through the middle, marking the line of fission about to take place. After fission has been accomplished the peculiar granular condition is assumed again by the whole of the nucleus. After continued fission has taken place for six or eight hours and asexual reproduction is accomplished, a change comes over the nucleus peculiar to each species, thus indicating that sexual reproduction is also absolutely due to, and initiated by, the nucleus. The nuclei at this stage are large, white and opaque, and two readily fuse if their organisms come into contact, producing a remarkable kernel-like structure in the centre, in which the protoplasm appears to be radially diffused, whilst their own outlines become indistinct and finally disappear. Dr. Dallinger considered this to be an act of true fertilisation, and emphasised his opinion that the nucleus is the sanctuary from which all the mandates regarding the cyclic changes emanate. He thought that there was something gained in being able to follow nature into these exquisite details, and observe that even such details were marked by no uncertainty or caprice, but that each mass of protoplasm could be no more false to its inheritance than an atom of chlorine.

Dr. Dallinger said he fully recognised the importance of the Darwinian law of adaptability to conditions and the survival of the most adaptable forms, and it was partly owing to a correspondence with the late Mr. Charles Darwin that he had been led to experiment upon the influence of varying conditions upon some of the lower forms of life. That he might expect some definite results he judged from the presence of algæ in hot springs, and also from the fact that the *Artemisia salina* had, by alteration of the salinity of the water in which it grew, been converted into an apparently different species of *Artemisia*, capable of reconversion. After a year and a half's tentative experiments he fixed for his specific organisms upon three of the saprophytes which he had already referred to, and upon heat as the best agent to employ as easy of control. The apparatus he employed consisted of a copper bath, into which three vessels containing the organisms were fitted, and which could be so regulated by means of a delicate thermostat that he could command a constant temperature with the limit of  $\frac{1}{4}^{\circ}$  F. The other special apparatus consisted of an ingeniously contrived water-cell for microscopic examination,

constructed on the principle employed and described by Dr. Dallinger some years ago, but slightly modified to allow of any temperature to be maintained during examination. Starting at a temperature of 60° F.; Dr. Dallinger raised the temperature of the bath cautiously at the rate of 1° per month. When 68° had been reached there was apparently no alteration of protoplasm, but an acceleration and increase of productiveness, but at 73° there was such a marked falling off in numbers that the temperature had to be lowered part of a degree and maintained so for about two months before it could be considered safe to again advance. A steady advance was then made in five months to 78°, which appeared to be a critical point, and it was found necessary to continually alternate the temperature between 77° and 78° for eight months, when the organisms appeared to have sufficiently adapted themselves to allow it to be again raised. Between 78° and 80°, a rise accomplished in three months, there was a tendency to vacuolation, the protoplasm of the organisms being permeated by several vacuoles sufficiently large to distort the shape of the organisms. When 80° was reached, however, vacuolation disappeared and nothing abnormal was apparent between 80° and 93°. At the latter temperature vacuolation again appeared, but on this occasion the vacuoles were smaller and more numerous, giving the protoplasm an almost spongy texture. This temperature had to be maintained for nine months before further advance could be made, but after keeping at 94° for three weeks vacuolation disappeared, and the organisms appeared very active and prolific. It was then found that 107° could be reached in comparatively rapid stages, when a slight vacuolation necessitated a delay of three months. In seven months more the temperature had been raised to 137°, but a year elapsed before the organisms could sustain the temperature of 138°, very large vacuoles being formed at this stage. Rapid progress was again made till 150° was reached, and more slowly to 155°, whilst at 158° F. he was again brought to a standstill by an accident which had a short time ago spoilt his experiment, but as he had already commenced again with better precautions, he hoped, profiting by experience, to be able to recover lost ground.

The results, so far obtained, showed that there was not a quiet rhythmical progression, as might be expected, but that at certain stages an apparently distinct physiological change took place, since,

when these were attained, the increase of a degree was sufficient to kill the organisms, whilst, it is almost unnecessary to add, a return to the original temperature was equally fatal. How far chemical, physical or physiological laws were implicated in these changes he did not pretend to determine, but he pointed out that the vacuoles were most probably filled with a gas, since their appearance was accompanied by an enlargement of the organism, whilst his inability to stain them proved them not to contain water, or a liquid of similar density.

The reproduction of these lectures in the "Proceedings of the Royal Institution" are looked forward to with expectancy.

### THE DENTAL MANUFACTURING COMPANY, LIMITED.

THE Annual General Meeting of the Shareholders of the above Company was held at the Registered Offices, 6 to 10, Lexington Street, on March 29th, Mr. DUNCAN D. HEPBURN in the chair.

The CHAIRMAN, in proposing the adoption of the report, said he had to congratulate the shareholders on the termination of the fourteenth year's business. Each successive year showed a more wide-spread demand for the Company's productions, not only at home but on the Continent and in the Colonies. The report also referred to the increase of capital necessary to enable an increased variety of the new teeth to be stocked. It had been found that, even with their present comparatively large stock, the demands could not be supplied. By the extension of premises preparation was being made for a larger output of instruments which were much needed.

Dr. CRAPPER seconded the resolution, and emphasized the necessity for increasing the capital, principally for further development of the splendid teeth which they were now making. It was proposed to raise the nominal capital to £60,000. Portions only of the £20,000 increase would be issued as necessary. Dr. Crapper took the opportunity of congratulating the shareholders on the outlook generally, especially as to the constantly increasing demand and evident appreciation of the goods of their own manufacture.

Dr. WORMALD, in replying to Dr. Cunningham, explained that several items of exceptional expenditure—notably, the issuing of a catalogue—reduced the profit which would otherwise have been at disposal; but, looking back over the past 14 years, he considered the dividends had been good for a commercial enterprise of the kind.

It would be remembered that the discount allowed shareholders equalled a 2 per cent. dividend, so that for the year under consideration, as well as the previous one, the dividends might be considered equal to 8 per cent., and the Company, with its new manufacture of teeth, was in a far stronger position than ever. Referring further to the stability of the Company, he compared its exceptionally strong position—with its stock valued only at cost price, and in many instances below that, and outstanding accounts spread amongst a very large number of dentists, and from which ample allowance is made annually for bad and doubtful debts—with that of many large concerns in the North, with which he was familiar, having the bulk of their capital invested in fixed plant and machinery, which had become obsolete through the introduction of improved machinery. Such a misfortune was impossible with this Company, and the more closely the balance-sheet was scrutinised, the more clearly would the strong financial position of the Company be discerned.

Mr. GREGSON stated that increased attention was now being given to the production of specialities in instruments.

Mr. BREWSTER, in reply to questions, explained that at no time had the Company surplus capital waiting employment. Of the £6,000 new capital obtained last year, the bulk went to increase the stock of new teeth, and the balance would be found in the debts owing to the Company. It was very gratifying to hear Dr. Cunningham speak so highly of the Company's pluggers and burs; and with reference to nerve instruments, these had not always been satisfactory in the past; but, by an improved method of manufacture recently adopted, they were now made of the finest quality.

The resolution adopting the report and balance-sheet was then passed unanimously.

Other formal business having been concluded, a cordial vote of thanks to the Chairman closed the proceedings.

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### THE FARADAY HOT AIR CAVITY DESSICATOR.

HEAT is the best disinfectant we possess, and a stream of hot air the most convenient form in which to apply it. The advantages of an intelligent use of hot air in dental operations are numerous; the disinfecting of dentine in devitalized teeth, the drying of antiseptic varnishes, the dessication of cavities generally before the insertion of fillings, are some of the most important. It is maintained as being



next to impossible to make a perfect filling in a moist cavity, whether gold, amalgam, fossiline, or a like substance be used, for where there is moisture the continuity of tooth substance and the filling cannot be ensured, and where the continuity is not ensured, there moisture will ever find an entrance.

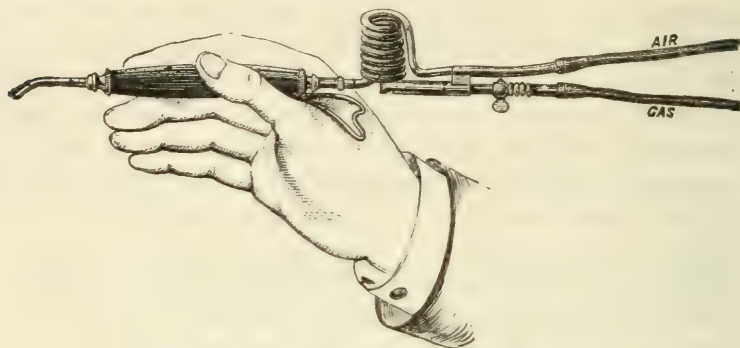


FIG. 1.

The old form of hot air syringe is unsatisfactory, being difficult to hold perfectly still, cooling very quickly, and giving a jerky blast.

The "Faraday Cavity Drier" has been designed by Mr. T. W. F. Rowney to overcome these imperfections, and when used with the foot-blower, its action is perfect.

The instrument is shown so well in the illustrations that but little explanation of its construction is necessary.



FIG. 2.

The current of air produced by the small foot-blower passes through a coil of tube, which is heated by a small Bunsen burner. In

one form of the instrument (Fig. 1) the burner is attached. In the other (Fig. 2) the instrument slips on to the burner, which forms a stand for it, or can be adapted to a spirit lamp.

Sufficient heat can be obtained in a minute and can be maintained in one form for any length of time, and regulated by means of the tap. In the other form the heat will last three or four minutes.

The nozzle is ground in so that it can be turned for use on the upper or lower teeth without altering the position of the instrument in the hand.

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### GOSSIP.

A STATEMENT appears in the *Japan Weekly Mail* that the "Beagle," in which Darwin made his notorious voyage, is now stationed at Yokosuka, in the Bay of Yeddo, where she is used as a Japanese training ship.

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THE latest application of electricity is by Mr. F. Lucas, who writes that an algebraic equation of any degree with real numerical co-efficients, may be directly solved without calculations by this subtle agent. However high the equation, a single operation suffices to obtain all the roots, both real and imaginary, and the power of electricity as a calculator is unlimited.

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It is pleasant to know that amidst the wide distribution of bacteria that there is still to be found a spot in the British Islands where we can enjoy our "otium" free from these death-dealing forms of life. A number of determinations were made last August by Professors Canelly and Wilson on the heather in the north of Forfarshire. These show that the air of the hills and moors was free from bacteria. It is true they contain instead 3.5 moulds per 10 litres of air, but the Britisher who goes northward for his holiday is in no danger of becoming mouldy in the land o' cakes and whisky.

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IF normal human blood drawn from the finger is placed on a slide and covered with glass, no crystallization of hæmoglobin occurs. If, however, a drop of putrid serum be added, crystallization takes place in 24 to 48 hours. In cancrum oris, which is an emphatically infective process, the same phenomena is observed.—C. J. BOND, in *Lancet*.

It is understood that the authorities of the National Dental Hospital, Great Portland Street, have secured a corner site in the same street, upon which they intend to erect a new building suited to the necessities of the hospital and the school. This is very much needed—so are funds.

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Sir WILLIAM JENNER, after seven years of office, retires from the Presidency of the Royal College of Physicians of London. This has been suggested as a fitting opportunity for creating a Medical Peerage.

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At a recent meeting of the Chemical Society, Mr. Crookes stated that he had found gold to boil violently when heated in the oxy-hydrogen flame, and to be so volatile that there would seem to be no doubt that it might be distilled in an apparatus similar to that employed by Stas in distilling silver. The volatility of gold is, therefore, evidently greater than hitherto supposed.

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THE Irish Exhibition, which will be opened at "Olympia," Kensington, London, on June 4th, has been undertaken with these considerations :—(1) To place before the English public a clear view of the predominant industries of Ireland. (2) To awaken public interests in the efforts being made to revive her trade. (3) To exhibit to the many thousands of persons in England who have never crossed the Irish Channel somewhat of her deeply interesting historical and antiquarian treasures. (4) To illustrate the worth and significance of Irish art ; and, finally, to help to moderate prejudices which, frequently tending to fetter the judgment, are at the very root of misunderstandings between people and people. It is believed that such an Exhibition held in London will be attended with the happiest results ; and will help to increase the interest everywhere taken in the Irish Exhibition to be held in Dublin. The profits are to be given in aid of Irish technical and commercial schools.

ACCORDING to the recent observations of Rink and Helland, the great Greenland glaciers travel at the rate of 35 feet per day. The average rate of Swiss glaciers is 15 inches. If this be correct, there must be an immense mass of ice and a vast snefond behind the glaciers urging them onwards.

THE effect of a layer of oil in smoothing a rough sea, which has lately become so interesting to all whose business is on the waters, seems to have been known as far back as the days of Pliny, in whose time oil was used for the same purpose. There is a curious narrative anent this subject in Bede's "*Historia Ecclesiastica*," lib. iii., cap. 15. When Utta was sent from the north of England by Oswin to fetch his bride from Kent, he applied to Aidan, the greatest teacher of the day, for his blessing. Aidan gave not only the blessing, but also some consecrated oil, and told him that on his way back by sea he would encounter a storm, and thereupon he was to pour the oil on the sea and it would become calm.

So important has colour blindness become in the mercantile marine that every candidate has to pass an examination both by daylight and by artificial light. The first is carried out by means of coloured cards which, after being shuffled, are presented to the candidate to name; by artificial light it is conducted by means of a lantern supplied with kerosene and provided with slides of coloured glass. It is stated that the physicians of America attribute colour blindness to inordinate smoking. Such a doctrine will not bear critical examination.

SOME curious results have been obtained by a series of experiments on the sense of taste. It is shown that the male can appreciate quinine in 300,000 parts of water, while the female can detect it when diluted with 456,000 parts of water. So also with sulphuric acid, bicarbonate of soda and cane sugar, the woman has the more sensitive taste; but with common salt this is reversed, as the male can detect 2,240 times, while the limit of taste in the female is reached at 1,980.

THE chair of Lecturer on Dental Surgery in the Medical College of the McGill University, Canada, has been offered to Mr. W. G. Beers, L.D.S., President of the Board of Examiners in the Province of Quebec. The course is to be specially on the application of dentistry to medical and surgical practice.



THE chewing movements of the rodents have lately been elucidated in a most interesting manner by Professor Gade. It has hitherto been but little known that the incisors of the lower jaw in the rat are capable of a lateral motion in two halves, tied together by ligaments. By this arrangement the gnawing process is carried on with a scissor-like movement of the two incisors, which materially assists in the work of destruction for which the whole order is celebrated.

DR. CAILLETET, well known for his success in the liquefaction of gases, is now experimenting on the production of diamonds by the combined action of heat and electricity upon chalk and condensed carbonic acid.

DAIRYMEN tell us that if milch kine drink water from a stagnate pond for days it has no deleterious action upon them, and in no way affects the quality of the milk they yield. This is no new doctrine ; but that which is old is not true, as the researches of Professor Law prove. Such milk he has found full of living organisms, identical with those abounding in the water from which the cows obtained their supply. These results show the great need of sanitation upon dairy farms.

MR. CHARLES H. SMALE, L.D.S.Eng., has been elected to the post of House Dental Surgeon to the Victoria Dental Hospital of Manchester, *vice* Mr. Charles H. Buckley L.D.S.Eng., resigned.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, and at the Manchester Hospital, from March 1st to March 31st, 1888 :—

				London.	National.	Victoria.
Number of Patients attended ...				—	1916	895
Extractions	Children under 14	...	...	424	218	565
	Adults ...	...	...	985	434	
	Under Nitrous Oxide	...	...	830	612	
Gold Stoppings	...	...	...	433	180	73
Other Stoppings...	...	...	...	1133	630	160
Advice and Scaling	...	...	...	113	310	—
Irregularities of the Teeth	...	...	...	158	245	—
Miscellaneous and Dressings	...	...	...	505	189	209
Total	...	...	...	4581	2818	1118

# THE DENTAL RECORD.

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## ANOTHER PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

*(Continued from page 201.)*

AFTER a short but pleasant stay in Toronto, we took ship for Montreal, by way of Lake Ontario and the justly celebrated St. Lawrence river. Our afternoon's quiet sail, mostly quite out of sight of land, served to impress us with the vastness of this inland sea. After enjoying a brilliant sunset we awoke the next morning to find our little steamer threading its way through that perfect labyrinth of picturesque isles, bearing the more than merited cognomen of the Thousand Islands. "What a glorious spot to dream away a lazy fortnight, exploring the intricacies of these rocky channels," was the mental note of all the hurrying globe-trotters on our boat.

This unique holiday resort is a rare example of a pretentious title exceeding, instead of falling short of, the reality, since this conglomeration of islands, according to the guide book, might be more accurately described as the thousand six hundred and ninety-two islands. The actual census, however, must be a matter of difficulty, if not caprice, on the part of the investigator, since, while many cover several acres, others are but barely visible; while some are miles in length, others are but a few yards long. These islands extend some forty miles below Lake Ontario and present every imaginable variety of shape, size and appearance; here they are great masses of bare, bold, rugged rock; there they are verdant to the water's edge and thickly wooded, now gorgeously brilliant in autumn tints and hues unknown in our own country.

After the so-called Lake of the Thousand Islands, the river opens to the width of about two miles, and we soon come to the world-famous rapids. The first of these is certainly disappointing, as there is scarcely anything to indicate that the steamer is not pursuing its usual and normal placid course.

"Shooting the Rapids," as a sensation, is scarcely worth noting at all until one reaches the Long Sault Rapids, which are some nine miles in length, through which a raft is said to drift in forty-five minutes. The Lachine Rapids, though the last and shortest, are the most turbulent and dangerous on the river. The sensation here is a novel one and for a time really intense. The guide-book description, "that it is terrible to the faint-hearted and exhilarating to the brave," is, however, very far-fetched when one is making the descent in one of the usual steamboats. Soon after passing the Rapids the spires and domes of Montreal, with Mont Réal or Mount Royal rising beyond the city, are just distinguishable in the growing night. Having been successfully trapped by one of the many abominable hotel touts on board we were soon whisked off to the Hotel Richelieu, which I mention by name only that others may avoid it. Our sole consolation in going there was that it carried us down into the French part of the city; the unmistakeably foreign aspect of the shops, the churches, the names of the streets, together with the peculiar French *patois* of the people, was a new experience when we remembered our feet were still on British soil.

On telephoning to one whose name was familiar to us as one of the most prominent Canadian dental practitioners, we ascertained that he was then away from home. Thanks, however, to his kind offices, I am enabled to lay some further facts as to the condition of dentistry in Canada, which cannot, I think, fail to interest my readers.

As early as 1844, when Montreal was the seat of Government, an effort was made to get a clause regulating dental practice included in a Medical Bill which was then before the House. The Parliament buildings were, however, destroyed by fire, and the project was consequently dropped. My correspondent states that this was the second effort of the kind on the American continent, since the State of Alabama had passed an Act in 1841. The incorporation of the dental profession of the province of Ontario, in 1868, was followed by that of the dental practitioners practising in the province of Quebec in the following year. The organisation differs very considerably from that of the larger province already described. All dental surgeons registered in accordance with the Act of Incorporation constitute a body politic, and are incorporated under the name of the Dental Association of the Province of Quebec. The Board of Trustees and Examiners grant certificates to all those complying

with the requisite conditions, which confer upon the successful candidate the title of Licentiate of Dental Surgery. In no sense is this association a teaching body, its duties being confined to regulating the condition of studentship and conducting the examinations which admit to practice.

Before entering upon the study of dentistry in the province of Quebec, every person must, previous to signing indentures with a licentiate, present to the secretary of the Board a certificate of having satisfactorily passed the matriculation examination prescribed by law. The Canadian practitioners are naturally proud of the matriculation examination which is required before the period of studentship can count, and which is very similar to our own, both as regards obligatory and optional subjects. The period of studentship comprises four years of actual service in the office of a licentiate, and the attendance after the second year upon at least one full course of lectures in a recognised dental or medical college upon the following subjects:—Anatomy (theoretical and practical), Physiology and Chemistry. In practical anatomy, the student must give proof of having dissected at least one head and neck. Certified tickets of regular attendance upon each subject are positively required. If a student desires to attend a Dental College, the actual time of such attendance is accepted as an equivalent to the same period of studentship. Students in their third and fourth years are supplied with a brief synopsis of studies, comprising an outline of the special subjects of examination.

After the usual requirements as to age, matriculation and studentship, the candidate is required to lodge with the treasurer a fee of sixty dollars, forty of which are refunded him in case of failure. A preliminary practical examination takes place, in which the student is required to perform operations in the mouth, and to give practical evidence of his skill as a mechanical dentist. The examination is written, oral and clinical, and divided as follows:—

1. Dental Anatomy and Physiology (Head and Neck).
2. Chemistry and Metallurgy.
3. Anæsthetics, Dental Hygiene.
4. Operative Dentistry (Theoretical and Practical).
5. Mechanical Dentistry                   "                   "
6. Dental Pathology, Therapeutics and Materia Medica.
7. Irregularities of the Teeth (Causes and Treatment).
8. Origin and Development of the Teeth.



Since 1885, every applicant has also been obliged to lodge with the secretary an original thesis upon some practical subject in dentistry, which he must defend before the Board of Examiners.

Since 1884, the annual assessment of two dollars has been imposed upon each licentiate; the only penalty for non-payment, however, seems to be that no licentiate in arrears is entitled to vote at the election of the Board of Examiners.

Another interesting resolution was passed in the same year, by which licentiates are not allowed to open branch offices under the charge of students or other unlicensed parties, and such students or other unlicensed parties are subject to be prosecuted if detected.

Provided the usual statutory notice of intended amendment or addition is duly made, any section of the by-laws, or any of the rules of order or regulations of the Board may be amended or additions made by a three-fifths vote of the members present.

The election of the Board of Examiners, seven in number, is made by ballot every three years, at the usual general meeting. This Board also conducts the general management of the affairs of the Association. The members of the Board are entitled to a fee not exceeding five dollars per diem, in addition to their travelling expenses, for every day that the Board shall sit. The Board has also power, upon a complaint made by any person lawfully practising the profession of dentist, to bring before the Board any member of the said Association accused of infringing the by-laws passed by the Board, or of any act derogatory to the honour or dignity of the profession of dentist, or of exercising a calling, trade or industry incompatible with such profession. The secretary is empowered to administer the oath or affirmation to witnesses on behalf of the complainant or of the accused, and also to summon before the Board any person who may be called upon to give evidence in the manner prescribed in the Code of Civil Procedure. Any person refusing to comply with this summons incurs a penalty not exceeding twenty dollars for each infringement. The Board has the power to censure and reprimand any member found guilty of any of the above enumerated offences, prevent him from attending and taking part in the meetings of the members of the said Association for a period not exceeding three years, and may even, according to the gravity of the offence, suspend the said member from the exercise of his profession in the province of Quebec for a period not exceeding one year. Every accused member who considers himself

aggrieved by any decision of the Board may appeal to a general meeting of the Association, provided the appellant deposits the sum of one hundred dollars as a security for payment of the costs occasioned by the calling of the general meeting and of those of the complainant. Every dentist found guilty of unlawful practices or of felony, or deprived by a civil interdiction of his civil rights, *ipso facto* ceases to have the right to practise as a dentist in the province, and the Board must delete his name from the list of members. The Board may, however, on the application of the person so struck off, reinstate him upon what are deemed proper conditions to impose.

“After the passing of this Act every person who, not being the bearer of a dentist's license granted by the Board of Examiners, constituted in virtue of this Act, or by the Board of Examiners, constituted in virtue of the Act 37 Vict., chap. 14, shall practise in this province the profession of dentist for a remuneration or in hope of a reward or of payment, either directly or indirectly, or who attempts to elude the law by causing his services as dentist to be indirectly paid by means of the sale of drugs or medicines, or who willingly and falsely claims to be in possession of a license granted under this Act, or the Acts above mentioned, or shall falsely make use of names, titles and qualities calculated to convey the impression that he is authorised to practise the profession of dentist, or shall make use of any title calculated to convey the impression that he is a graduate of a college of dentists, may, upon complaint or information sworn to before a justice of the peace, made by a person of at least twenty-one years of age, be brought by a simple writ of summons or by a warrant of arrest in the discretion of any court of competent jurisdiction, and, upon conviction of any of the offences above-mentioned, be condemned to pay a fine not exceeding two hundred dollars, with costs, for each offence, and in default of payment of such fine and costs, the defendant may be condemned to an imprisonment in the common gaol of the district in which the sentence has been pronounced for a period not exceeding three months, unless the said penalty and costs be sooner paid.

“If the person so found guilty of any of the offences above enumerated should be again accused and convicted of any of the offences above enumerated, he shall then be condemned to pay a fine not exceeding four hundred dollars, including costs, for each offence, and, in default of payment, to an imprisonment not exceeding six months, unless the said penalty and costs be sooner paid.

"No person so unlawfully practising the profession of dentist shall recover before any court of justice any sum of money for the professional services so rendered, or for the medicines or other materials supplied in such unlawful practice.

"The fines imposed by this Act shall be payable to the treasurer of the Association, and shall form part of the funds of such Association.

"Nothing in this Act shall be construed as restricting the privileges conferred upon physicians and surgeons in the province of Quebec by the various Acts relating to the practice of medicine and surgery therein . . . . but in the event of a physician or surgeon desiring to practise as a dentist and to be publicly known as such, he shall before doing so be obliged to obtain a license from the Board of Examiners of such Association, by submitting to an examination upon the mechanical and practical part of dental surgery and by paying the fee fixed by the bye-laws for the obtaining of such license."

The number of dentists practising in the province of Quebec only amount to sixty.

The following extracts from a correspondence with a well-known dental practitioner in Montreal presents some of the difficulties encountered by our Canadian *confrères* :—"I wish to point out several important points. When, in 1868-69, we asked the Legislature for incorporation, there was no sort of restraint upon dental practice. We, who were the founders and the fathers of dental reform, had served long studentships of from five to seven years, and attended medical lectures at McGill College (Montreal) and Toronto, but without graduating. The Medical Council, in grading several of us, who obtained registration in 1879, actually classed our students, just fledged, above their tutors, because they had passed an examination before their examiners. It seemed incongruous that the examined should be graded higher than their examiners. We had, however, to throw all our time and energy into the political organisation of the profession. However, you will appreciate *what we did not do*. We did not ask the Legislature to give us the title of Doctor of Dental Surgery, and even our college does not bestow it. We took the L.D.S. as more harmonious with our feelings, especially as at that time the traffic in the D.D.S. diploma was an open imposture, and as we had every opportunity to witness the rapidity with which ignorant boys were metamorphosed into dentists



in the United States. . . . You may wonder why Quebec, the old Canada of the Conquest, is behindhand in the matter of teaching. The difference in our numerical strength might alone explain it; but there is one particular reason which explains many other unfortunate matters in our social and educational condition. When the country was conquered, England permitted the continuance of French laws and the French language for all time to come. Happily for the other provinces, it has only applied to Quebec, since it has hung like a millstone about the neck of national, educational and social progress. Our French *confrères*, with whom we are in the happiest accord, are heavily handicapped, as the U.S. Dental Colleges insist upon a knowledge of English, and as, until recently, there have been no text books in the French language, which is one of the two legal languages in Quebec. Now, united, we are not strong enough to organise and maintain a dental college; divided as we are in language, it is an absolute impossibility. All told, we have not more than a dozen students, and lectures would have to be delivered in two languages. Even religion intrudes itself, or, rather, is forced upon us. The Roman Catholic Church has put a bar upon attendance at Protestant universities, and the dim chance of an affiliation with McGill, the first of our medical colleges, was destroyed by this interference. The next best thing we can hope to do is to found a system of free clinics, and the appointment of dentists to hospitals and dispensaries, as, unless we can unite our forces, we cannot accomplish anything better. . . . I may say that I personally favour reciprocity between the provinces in the matter of the license; but Quebec is the weaker and would get the worst of it."

*(To be concluded.)*

## SPECIAL PATHOLOGY OF THE WISDOM TEETH.

By WILLIAM RUSHTON.

*(A Paper read before the Students' Society of the National Dental College.)*

MR. PRESIDENT AND GENTLEMEN,—The subject of my paper to-night is the "Special Pathology of the Wisdom Teeth," and I hope you will bear with me while I briefly touch upon a few points which I hope will be of interest.

The question might naturally be asked, "Why have wisdom teeth a *special* pathology, differing from their fellows in the mouth?"



I think that two reasons may be assigned ; one, that the jaw, as a rule, when wisdom teeth trouble exists, is too contracted to contain its full complement of teeth, therefore the wisdom teeth, which come into place last, have more or less difficulty in eruption, and consequently cause more or less disturbance ; the other reason is the close proximity of the wisdom teeth (especially the lower) to the branches of the fifth nerve. Let us inquire how it comes about that the jaw is too contracted to contain its full complement of teeth. Darwin, in his work, the "Descent of Man," gives the following reasons :—"The early male forefathers of man were probably furnished with great canine teeth, but as they gradually acquired the habit of using stones, clubs and other weapons for fighting with their enemies or rivals, they would use their jaws and teeth less and less. In this case the jaws, together with the teeth, would become reduced in size, as we may feel almost sure from innumerable analogous cases." Mr. Darwin endeavours to show that the disuse of the jaws in sexual warfare tended to their diminution in size and power. The following extract from the same work will show that partial disuse of the jaws in mastication is also an important factor. He says : "It appears as if the posterior molars or wisdom teeth were tending to become rudimentary in the more civilised races of man. I have been assured that they are much more liable to decay, and are earlier lost than the other teeth. They are also much more liable to vary, both in structure and in the period of their development, than the other teeth. Professor Schaafhausen accounts for the difference between the races by 'the posterior dental portion of the jaw being always shortened in those that are civilised,' and this shortening may, I presume, be attributed to civilised men habitually feeding on soft cooked food, and thus using the jaws less." Speaking again of the effects of the increased use and disuse of parts, the same writer says : "From the correlation which exists at least in some cases between the development of the extremities and of the jaws, it is possible that in those classes which do not labour much with their hands and feet, the jaws would be reduced in size from this cause. That they are generally smaller in refined and civilised men than in hardworking men and savages is certain." Thus, then, we have three more or less cogent reasons for the diminution in size of the jaws. Add to these the fact that in civilised races men are apt to choose wives with small jaws, that is to say, of a refined cast of eature, therefore the offspring will be sure to have this feature

reproduced more or less. The jaws being of a tissue more yielding than that of the teeth, changes take place in the former more rapidly than in the dense dentinal tissues, and hence we have the phenomenon of an overcrowded dental arch.

Next let us consider the effects of this overcrowding upon the wisdom teeth. First, difficult and painful eruption. The eruption of wisdom teeth is often the cause of pain and even of serious illness. Neuralgic and rheumatic pains, swelling, inflammation and even ulceration may occur. The pain is not always confined to the affected part, but may be felt in the ear and has been known to proceed as far as the clavicle, while the inflammation may affect the tonsils. Wedl speaks of difficult eruption of wisdom teeth being accompanied by a very obstinate cough like whooping cough, and of cases in which very obstinate attacks of dysentric diarrhœa which continued five, six or seven months have occurred. The eruption of the upper wisdom tooth is not as a rule so painful as that of the lower. In the upper the malposed tooth generally points backwards or outwards, and the worst that happens is the contusion of the opposing mucous membrane about the base of the coronoid process or of that of the cheek. In the lower, where it is a more serious matter, the trouble may not be caused so much by the abnormal position of the crown of the tooth (as in the upper jaw), but rather because the horizontal ramus of the jaw is so short that the crown can only be partially erupted, if at all. Besides, the ramus of the lower jaw is of dense unyielding bone, while the tuberosity of the upper is of a more cancellous structure. When the jaws are brought together the mucous membrane is contused and great pain, inflammation and suppuration may ensue, the inflammation proceeding to the adjoining tissues of the cheek and fauces. Trismus or tonic spasm of the muscles of the jaw sometimes supervenes and the lymphatic glands may become swollen and tender. M. Nelaton and other writers quote cases in which the symptoms in painful eruption of wisdom teeth have been mistaken for scrofulous caries of the jaws, for syphilis and for cancer.

Secondly, impacted and unerupted wisdom teeth. Wisdom teeth in the lower jaw are often impacted between the dense unyielding ramus and the also unyielding second molar, giving rise to symptoms of different degrees of severity. As a rule the tooth in these cases has a forward horizontal direction, in consequence of its vertical growth being prevented by the resistance of the bone above it. It is thus tightly wedged. The consequences of this are chiefly the

following : Neuralgic pains, swelling, inflammation and suppuration, trismus, dentigerous cysts; caries, absorption and necrosis of the second molar. Instances are not wanting in which partial paralysis, epilepsy, delirium, mental derangement and suicide have been the results of impaction, and I think to these results may be added the danger of the performance of severe operations, through the cause of trouble not being properly understood. I shall briefly quote a few cases in point. I have here a specimen of an impacted wisdom tooth, kindly given me by Mr. Pattinson, which was the cause of much suffering of a neuralgic kind. The wisdom tooth was buried beneath the gum, and extensively carious. Mr. Pattinson, finding that it was impossible to extract the wisdom tooth without previously extracting the second molar, did so, the result being complete relief. Mr. Salter gives an instance of suppuration extending along the jaw from an impacted wisdom tooth, accompanied by pain and swelling, with nearly complete closure of the lower jaw. The patient had been attended by a practitioner who had mistaken the cause of his trouble. His face was permanently disfigured by cicatrices, and in their midst was a mass of pouting granulations about the size of half-a-crown, from which pus was being discharged. On exploration with a probe the cause of the trouble was found deeply impacted at the base of the coronoid process, the tooth pointing forwards and outwards. After gradually wedging the mouth open for a period of three weeks, the tooth was with great difficulty extracted through the mouth, thus saving the patient from a severe operation. Mr. Coleman mentions a somewhat similar case in which the cause had been overlooked, and the jaw had been trephined in the hope of opening up an abscess. Relief was obtained when the cause of trouble (a tooth) was removed. Trismus is not unfrequently a consequence of impacted wisdom teeth. But, first of all, I should like to remark that the definition of trismus among writers on dentistry seems to vary. Mr. Salter terms it a spasmodic contraction of the muscles of the jaw, continuous and of a truly tonic character. Mr. Heath says the term, as generally used, is etymologically incorrect, as it is applicable to the grinding and gnashing of the teeth in convulsions rather than to the tonic spasm of tetanus. Mr. Morgan Hughes relates a case occurring in the practice of Dr. Mapother, of Dublin, in which a lady of twenty-four suffered from trismus for eighteen months, due to impaction of the lower wisdom tooth (Mr. Hughes does not say whether the closure was mechanical as well as reflex). The central



incisors could only be separated two lines. The second molar and wisdom tooth were extracted, and, although the trismus had lasted so long, the stiffness soon subsided. In ordinary cases of dentigerous cysts, the cause is very obscure, but, as Salter says, "When a wisdom tooth is impacted and held back behind a second molar, the irritation consequent upon a restrained position may account for it;" and there is no doubt that dentigerous cysts, resulting from impacted wisdom teeth, are comparatively frequent and serious. I quote a case taken from a memoir of Dr. Forget, of Paris, showing to what extent dentigerous cysts of this sort may go. The patient, a woman, exhibited a swelling of the right half of the lower jaw about the size and shape of a hen's egg, bounded in front by the second incisor and behind by the coronoid process. Several of her teeth on the same side had fallen out, and she had more or less pain for ten years. Lisfranc resected the half of the jaw, and the patient was discharged cured. The examination of the section showed a development of the body of the jaw, formed by the two tables of the maxilla, which were very thin and reduced at many points to the mere thickness of the periosteum, and filled with carious and purulent fluid. The bottom formed by the base of the bone, very much widened, presented in projection the crown of the wisdom tooth firmly enclosed in the base of the coronoid process. The anomalous position and regular development exhibited by the tooth in this vicious situation can leave no doubt as to the part it had played in the production and evolution of disease of the bone. It could not become enlarged without exerting a continual pressure on the neighbouring teeth, causing prolonged suffering, inflammation of the gums, decay, loosening and spontaneous falling out of the other teeth.

Sir John Tomes and Messrs. Salter and Coleman all mention cases in which the pressure of the impacted wisdom tooth has produced absorption, erosion, or necrosis in the second molar, and they all give one the impression that this takes place through the direct pressure of the wisdom tooth. Sir John Tomes says: "The posterior fang of the second molar was much eroded by the pressure of the wisdom tooth." Mr. Coleman gives an example of an unerupted wisdom tooth, "which by pressure has caused absorption of the approximal surface of a second molar." Mr. Salter says: "The posterior fang of the second molar is apt to be eroded by absorption (caused by an impacted wisdom tooth), and the fang may be so



much absorbed as to open the pulp cavity of the tooth, and even to pass through it and erode the posterior surface of the right fang." That these erosions or absorptions do take place there can be no doubt, but that they are made by the direct pressure of the wisdom tooth is open to question. I should like to hear some opinions on this point.

I have now enumerated the chief troubles arising from impacted and unerupted wisdom teeth. Such teeth very often give no trouble, and they are frequently found out only by accident—as in the remarkable specimen of Sir E. Saunders, in which the wisdom teeth were found imbedded high up in the ramus, the crown reaching nearly to the level of the sigmoid notch—but as a rule they do give trouble sooner or later.

I shall now pass on to irregularities in size and shape of the wisdom teeth, including exostosis and enamel nodules, and union of second and third molars, together with special accidents in their extraction. I shall, also, briefly mention the points to be taken into consideration when deciding whether to extract the wisdom tooth or the second molar, and lastly, I shall mention a case of reversion of the wisdom tooth.

We have it on the authority of Professor Flower that the wisdom tooth is, of all others, the one most frequently found suppressed. It is also the tooth in which the greatest variation takes place, both in size and shape. I cannot do better than quote the words of Sir John Tomes: "No rule can be laid down for the form and number of the roots of the *dentes sapientiæ*, so variable and inconstant are the forms assumed by these teeth. In one case the tooth is terminated by a single conical root; in another, the one is replaced by five or even six small roots." Thus we see that the variation from the typical molar found in apes and savages is very great, and there can be no doubt that in succeeding generations these teeth will be lost. When the wisdom tooth is abnormally small, it is on this account that it is tolerated in the often contracted jaw; but when, on the other hand, it is normal or abnormally large, the trouble that it brings, both in and after eruption, has already been dwelt upon. Although exostosis and enamel nodules do not belong to the special pathology of the wisdom teeth strictly speaking, yet when we consider the close connection of those teeth to the branches of the fifth nerve, we can understand how they cause more intense suffering than similar disease in the first or second molars. I have here a

specimen of an upper wisdom tooth, kindly placed at my disposal by Mr. Boyd Wallis, in which a small enamel nodule was the cause of many years of intense neuralgia, for which advice had been sought from the first physicians of the day. Mr. Wallis extracted the tooth, not with the idea of relieving the neuralgia, but because of the malposition and consequent worthlessness of the tooth. However, the extraction removed the cause of suffering, and the patient has been relieved ever since. Here is a tooth, a lower wisdom, which, as you will see, is much exostosed, and was the cause of closure of the jaws and much suffering. The tooth was lent to me by Mr. Marcus Davis, by whom it was extracted with great difficulty.

The cases in which cemental union has taken place between the wisdom tooth and second molar are somewhat numerous, but sometimes the union takes place between the dentine and enamel of the respective teeth; in this case the teeth have a common pulp chamber. In the cemental union junction has no doubt taken place after the crowns were formed and while the roots were forming. In the latter case the more intimate union has taken place in the early stages of development. I have two cases here of cemental union kindly lent me by Mr. Gaddes, and I have endeavoured to depict some somewhat similar ones copied from Tomes and Wedl, one case being that of a supernumerary wisdom tooth cemented to the normal one. In these abnormally formed wisdom teeth there are always two dangers attending their extraction. In the upper jaw there is the danger of damaging the tuberosity, and in the lower the danger of injuring the inferior dental nerve. In cases like those we have just seen, great care should be exercised if extra resistance be shown when using the forceps, as the carrying away the tuberosity may result in complete deafness on the injured side. For the same reason the elevator should not be employed to an upper wisdom, though in the lower it is invaluable, as so often the backward curve of the roots allow of the tooth being displaced with comparative ease. In the lower jaw the inferior dental canal may perforate the fang of the wisdom tooth, so that an extraction may cause loss of sensation on the same side for greater or less periods. Or, in a difficult extraction of a lower wisdom tooth, the nerve trunk may be injured.

As a rule, when there is a doubt as to whether the second or third molars should be extracted, it is better that the wisdom tooth should be removed, as it is more liable to decay and is not so useful for mastication. But if, on the other hand, the second molar is

carious or loose or necrosed, or it is impossible to extract the wisdom tooth through closure of the jaws or impaction, the second molar should be removed. In cases of suppuration caused by the wisdom tooth and involving the second molar, the wisdom tooth should be extracted.

I shall now speak briefly of reversion of the wisdom tooth—that is to say, of cases in which the tooth has been formed upside down. Sir John Tomes is the only author whom I have consulted who mentions the fact at all. He gives two cases, one being a reverted wisdom tooth, the fangs of which were interlocked with those of the second molar and extracted with it. The other case is one in which the crown was directed outwards towards the cheek; therefore, I should say that it was not a case in which, as he says, “the direction was completely reversed,” because for *complete* reversal the crown should be buried in the jaw and the root should point towards the gum. I have here a tooth which I extracted from a patient in this hospital, a woman of fifty-one. There was a tense painless swelling on the left side of the palate, consequently the removal of several molar and bicuspid stumps on the affected side was accomplished, the result being the subsidence of the swelling. Before I extracted this tooth I naturally thought it was a *wisdom tooth stump*, instead of which I found to my surprise that the tooth had erupted fang foremost and that the crown had been buried in the alveolus from which I had dislodged it. Upon enquiry I found that the tooth had never given trouble (unless the swelling spoken of was the result of this tooth), and it had evidently taken its share in mastication, as we may judge by the way in which its fang is worn down and the high polish it has acquired. This case differs from those mentioned by Tomes in that the tooth had no connection at all with the second molar and it was not horizontal or oblique, but simply upside down, the crown where the root ought to be and *vice versa*. The crown is perfectly formed and the pulp canal is closed by formation of secondary dentine. The points I should like briefly to discuss are these: What caused the reversion of the tooth? How can we account for the eruption of the tooth in a reversed direction? When was the secondary dentine formed? What prevented the tooth being rejected as a foreign body?

I can give no satisfactory theory of its reversion, except that the wandering of the enamel germ, in the first instance, together with the pressure of the second molar, may have been the cause. As to



the cause of its eruption fang first, I think that as so little is known about the forces that regulate the normal eruption of teeth, that it is almost useless to theorise about them when appearing as this has done. It may be probable that no eruption has taken place at all, but that the gum has recoiled sufficiently to lay bare the fang. The occurrence of secondary dentine, I think, is very interesting. It must have been formed prior to the eruption of the fang, as, of course, masticating would have been fatal to the pulp, and the pulp must have been alive when it produced the secondary dentine. I can only conceive that the abnormal pressure which, I presume, altered the position of the tooth would tend to set up irritation of the surrounding parts, which irritation being transmitted to the pulp, was sufficient to cause the secondary dentine and consequently no pain on eruption.

And lastly, what prevented the tooth being rejected? The pulp was dead, the crown—through which no nutriment or connection could, as most authors aver, take place with the periosteum—was fairly large, and against these we have a very narrow band of living cementum. I suppose the reason is that there was just sufficient vitality remaining in this narrow strip of cementum which, taken in combination with the fact that the thick end of the wedge was locked in the alveolus instead of the thin one (as is usual), was sufficient to prevent the rejection of this remarkable tooth.

In conclusion, I must express my thanks to the many friends who have helped me by lending me specimens and in other ways, and I must also thank you all for the patience you have shown during the reading of this paper. I have no doubt there are points which I have omitted and others upon which I might have dilated more fully. The subject is a very interesting one, and I think that any remarks, whether new or old, are serviceable. It is good for us to be told what we do not know, but it is also very useful to be reminded sometimes of what we do know.

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### THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE Ordinary General Meeting of the above Society was held at 40, Leicester Square, on Monday, the 7th ult., Vice-President Mr. HOWARD MUMMERY, M.R.C.S., L.D.S.Eng., in the unavoidable absence of the President, in the chair.

Mr. FELIX WEISS (the Librarian) announced some additions to the Library.



Mr. STORER BENNETT, the Curator, reported that Mr. Pearce, of Greenwich, had loaned to the Society most interesting specimens of two geminated bicuspidis or bicuspidis with two crowns. All the teeth seemed to have been *in situ*. The specimens were taken from a patient, aged twenty, and not only represented two crowns, but appeared to have been spirally rotated upon. Another specimen of two geminated central incisors had been given to the Museum by a gentleman who was not a member of the Society. The teeth were presented posteriorly, and when removed, two other teeth came down in place of them. This specimen was extremely interesting, as, in addition to the gemination, there appeared to be an odontome on the inside of the teeth.

Mr. MORTON SMALE showed, and briefly described, the electrical apparatus he was employing. It consisted of a battery, motor, mallet, mouth lamp, and search lamp. In answer to questions, he stated that he had had them in continuous use for six months without having to renew the battery, from which he obtained sufficient power for all dental purposes, including polishing with corundum discs. The cost of the whole apparatus was about £30, and of each cell 10s. 6d.; the solution he believed was chromic acid and sulphuric acid, but, being a patent, the makers were unwilling to afford information.

Dr. E. T. BLAKE then read a paper on

#### DENTAL REFLEXES AND TROPHIC CHANGES.

Many general disorders were occasioned by conditions of the teeth, and only by a freer intercourse between the two branches of the medical profession would obscurities and difficulties be removed.

The general changes induced by dental abnormalities might be classed under three principal headings:—

1. Those immediately modifying the production of new blood, both in quantity and quality.
2. Those manifesting themselves in neuro-cerebral symptoms.
3. Septic changes, which for practical purposes would include cases of septicæmia and prolonged absorption of disintegrated purulent products.

Nutrition was affected through the appetite, which in turn was impaired by the slightest disease of the mouth or teeth. An aching tooth was often sufficient to cause complete anorexia. Nutrition also suffered from dental dyspepsia, which had four common causes: (1) It occurred as a reflex neurosis; (2) defective mastication and insalivation; (3) the influence of septic or purulent discharges from

the teeth and gums upon the gastric mucosa ; (4) the indirect influence of pulmonary poisoning.

The close relation between neglected carious teeth and hypertrophy of tonsils was long ago observed by Liston.

The interdependence of tooth and tonsil might be of four kinds : (*a*) Arising from the conveyance of morbid material from a tooth to a tonsil. (*b*) Enlargement of tonsil through reflex irritation by way of Meckel's ganglion. (*c*) Fair children especially were often found with the whole osseous and glandular system in a faulty state. In such children the decayed teeth and enlarged tonsils were common results of a common widely acting cause. (*d*) Enlarged tonsils aggravate the defective dental condition, by compelling the child to inhale air by way of the mouth instead of through the nose, and thus the teeth were exposed to the pernicious influence of abrupt changes of temperature.

The teeth had an influence on the lymphatic system. Those lymphatic glands situated in the immediate neighbourhood of the mouth were occasionally found enlarged and indurated. Often this was merely the result of local irritation. Either purulent or septic matter from the teeth or gums was carried directly to the gland, and there it induced chronic changes which soon disappeared on removing the local cause. Those enlargements showed no new gland structure, though they were often confounded with true adenoma and were sometimes styled "scrofulous." They might be the direct result of auto-infection. Attention might be directed to an important diagnostic point ; it was known that the superficial cervical glands lying above the sternomastoid had no direct communication with the teeth. If, then, enlarged glands were found between the platysma and the sternomastoid, they were not due to dental disease. In other words, if the glands moved on rotating the head, they were not due to dental changes, and would not be cured by any dental operations. This was an extremely useful differentiation.

Both diarrhœa and constipation were due to defective teeth, and, indirectly, suspended catamenia might arise.

With reference to neuro-cerebral derangements, commonest amongst them was pain in some distribution of the trifacial. The diagnosis of the precise nature of the pain, referred to the sensory filaments of the fifth cranial nerve, should never be attempted without a dental mirror and a set of fine steel probes. In support

of the foregoing statements some dozen cases were cited, the histories of which occupied a considerable space in the somewhat lengthy paper. The citations included a case of sub-occipital pains, cured by the removal of unerupted wisdom teeth, and one of colic traced to the entire absence of molar teeth; a case of reflex amblyopia, due to overcrowding of the teeth; one of phlyctenular conjunctivitis, in which the eye was restored to a healthy condition by the extraction of defective teeth. Under the head of septic changes, cases of rheumatic gout, scorbutic gingivitis, and psoriasis were mentioned.

Dr. ROBERT COOPER, a visitor, absorbed all the time that could be allotted to the discussion of this paper, the substance of his remarks being that diseases of the ear frequently arose from defective wisdom teeth.

Dr. GEORGE CUNNINGHAM, Cambridge, followed with a paper entitled

#### A STATISTICAL ENQUIRY AS TO THE IMMEDIATE TREATMENT OF PULPLESS AND ABSCESSSED TEETH.

Immediate treatment might be defined as the method by which the roots of pulpless or abscessed teeth were filled at one sitting, irrespective of previous conditions. The method, although not described by that name, had been recognised as permissible and appropriate in certain cases by the latest text-books; nor was it so new or untried a thing as so often asserted, for Mr. Coleman advocated immediate treatment—although not immediate root-filling—at the British Dental Association Meeting in 1882.

To Professor Hesse, of Leipzig, Dr. Cunningham was inclined to award the credit of first publicly advocating immediate root-filling as a general practice, in an article published in 1884. He advocated it, not only as effecting a great saving of time, but also as giving more certain results.

Writers on immediate treatment were, like those on the dressing method, divided into two distinct classes,—viz., those who advocated and those who opposed the use of the nerve drill, for which it would appear that the reaming out of the canals was not essential to the success of the method. After quoting Dr. Ottofy's description of his mode of procedure (p. 269), Dr. Cunningham proceeded to describe the course he had adopted throughout in the cases he had recorded and tabulated as follows:—First, free and direct access was as far as possible obtained, and bold excavation of the crown in the requisite

direction was adopted. Secondly, the rubber dam was employed in every possible instance. Thirdly, the root canals were freely reamed out with the nerve drills in the dental engine as far towards the apex as was deemed safe. Fourthly, the injection or application of medicaments. Fifthly, the material invariably employed for filling roots was zinc oxychloride. Sixthly, the crown cavity was then treated in the usual way, and lastly, wherever possible, with a permanent filling, such as gold or amalgam.

The cases in which immediate root filling was applicable might be discussed under three distinct conditions:—Class I. Under this head was tabulated all those permanent teeth where the pulp was devitalized by immediate extirpation or by cauterization. In the table, thirty-four cases were given; eleven in which immediate extirpation was employed, and twenty-three in which cauterization was adopted. *Subsequent pericementitis* was only present in one out of twenty-three cases, and in this it was to be feared it was due to accidental perforation of the root. Three other cases of perforations occurred giving rise to symptoms. Of forty-five teeth so treated, permanent crown fillings were inserted in twenty-six. The rubber-dam was employed in thirty-three out of thirty-four cases.

CLASS II.—Included only those teeth where there was already a fistulous opening on the gum, or one obtainable by lancing, indicating the presence of an abscess. In the treatment of these cases no effort was made to pump any medicament through the end of the root into the apical space, nor were any special efforts made to enlarge the apical foramen. In five out of twenty-one cases, the contents of the pulp canal were dry. Of twelve moist, only two were associated with pus. The fistulous opening was closed in two cases, and discharging in seventeen. The effect of operation upon fistulæ was noted in sixteen cases; in fifteen they closed in from one to fourteen days. In one case the fistulous opening was found still patent at the end of three months. One case only was followed by acute inflammation. Thirteen out of twenty-one cases were immediately and permanently occluded by metallic stopping. The rubber-dam was applied in eighteen cases; in only two did slight inflammation follow the operation.

CLASS III.—The total number of teeth falling under this class were sixty: but only in two-thirds of them had the character of the pulp canal contents been noted. Of thirty-nine cases, it was found



that the contents were dry in fifteen and moist in twenty-four; in these last, eighteen were gangrenous and six accompanied with pus. In the fifteen cases in which the contents were dry, two were noted as being affected with pericementitis *before* the operation. In the remaining thirteen, no pericementitis occurred after the operation. Of the twenty-four cases in which the contents were moist, five of the eighteen not associated with pus were affected with previous pericementitis; of these, four subsided rapidly after the operation. The remaining case led to an increase of pain until the eighth day. Of the thirteen unassociated with pericementitis before the operation, only one was followed with slight inflammation, which lasted about twenty-four hours. Of the six cases in which pus was present, all, with one exception, responded rapidly to the operation. In four cases, large deposits of secondary dentine occupied the pulp cavity, and were associated with putrefaction and moisture or pus.

Of the sixty cases noted, fifteen were affected with pericementitis before operation. So far as the root filling was concerned, these cases were treated in precisely the same way as the others. In every case the inflammation, whether slight or acute, terminated by resolution, not by suppuration. Of the forty-five cases in which pericementitis was absent, only four gave rise to any noticeable symptoms. Two of these were slightly affected with pericementitis. The third case was more acute and much more serious. In this instance a left lower molar tooth had been filled three weeks previously, and beneath the filling evidence of a chronic suppuration was found in the presence of a copious discharge of pus which filled the otherwise empty distal canal; one root-canal also contained a putrid cotton wool dressing, which was probably the cause of subsequent inflammation. In one case an unusually large apical foramen existed, but no serious trouble resulted from this condition. A table was shown comparing the proportions of pericementitis as occurring in cases of dry and moist gangrene of the pulp *previous* to treatment, from which it appeared that pericementitis is just twice as frequent in those cases where the pulp *débris* is moist as in those where it is dry. A similar table was also given, showing the proportion of cases in which pericementitis occurred *subsequent* to operation, from which it was demonstrated that cases of dry pulp chamber contents are less liable to inflammation after operation, and also that operative interference is less provocative of inflammation than the policy of non-interference not unfrequently adopted by the practitioner.

Permanent crown fillings : of the sixty teeth treated, forty-one were at once filled with a permanent stopping of gold or amalgam ; where time would not permit of a permanent filling, a temporary stopping of phosphate cement, zinc oxychloride, or gutta-percha was resorted to. Of thirty-eight cases under Class III., Dr. Cunningham inserted seven gold, twenty amalgam, and three crowns, or 79.5 per cent. of immediate permanent fillings. This immediate insertion of a permanent filling he regarded as possibly an important factor in bringing about the good results recorded. His experience with the rubber dam leads him to the conclusion that it is a safeguard which, although always advisable, is not absolutely essential to successful treatment.

The usual votes of thanks followed upon the conclusion of the paper, and the proceedings then terminated.

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### GENERAL MEDICAL COUNCIL.

THE forty-fourth session of the General Medical Council was held from the 22nd till the 26th of May, Professor JOHN MARSHALL, F.R.S., President, in the chair.

#### REMOVAL OF A DENTAL QUALIFICATION ON THE 24TH ULT.

The Council proceeded to consider the report from the Dental Committee in regard to the case of George Thomas Ockleford Crocker.

Mr. FARRER, Solicitor to the Council, said the name of Mr. George Thomas Ockleford Crocker was on the Dentists' Register by virtue of two qualifications—as having practised before July 27th, 1878, and also as having a later qualification granted him by the Faculty of Physicians and Surgeons of Glasgow. On May 7th, 1888, the Faculty of Physicians and Surgeons of Glasgow had passed a resolution erasing the name of Mr. Crocker from the list of the Faculty's Licentiates in Dental Surgery on the ground that he had violated the obligation in the declaration which he subscribed on admission, that he would not “advertise or employ any other unprofessional mode of attracting business.” Two attempts had been made to communicate with Mr. Crocker by means of registered letters, but he had refused to accept notice to appear. The case therefore simply resolved itself into one of directing the Registrar to make his Register correct by removing the one qualification that

had been withdrawn. His name would remain on the Register in virtue of his having been in practice before July, 1878.

The PRESIDENT then moved from the chair, "That the qualifications of Licentiate in Dental Surgery of the Faculty of Physicians and Surgeons of Glasgow appended to the name of George Thomas Ockleford Crocker be erased from the Dentists' Register."

The resolution was agreed to.

Before the Council adjourned, on the 26th ult., Mr. B. CARTER called attention to an advertisement issued by H. F. Partridge (whose name had been erased from the Dental Register), and to the names of certain registered medical practitioners appended thereto, with a view to action being taken by the bodies from whom those gentlemen derived their qualifications. The circular, he said, stated that Mr. Partridge was "under the patronage" of the gentlemen named, all of whom were well-known practitioners. He presumed that they were ignorant of the use made of their names; if not, they were committing an offence of which the bodies from whom they had received their qualifications might well take cognisance. He did not propose any motion on the subject, thinking that his object might be served by calling attention to the case.

Sir DYCE DUCKWORTH said he believed there was no Licentiate of the College of Physicians of London on the list of names in the circular. If there had been he should certainly have called the attention of the College to the fact.

This concluded the business of the session.

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### **A CURIOUS CASE OF MALINGERING.**

By A. PEARCE GOULD, M.S., F.R.C.S.

EARLY in April I was asked by a friend to see a servant girl who was stated to have a "dead tumour" in the cheek and a similar one growing on the other side. One surgeon had advised their removal; another had regarded the case as hopeless. The patient was brought to me at the Temperance Hospital on April 12th; she was twenty years of age, apparently in excellent health, and she showed great reluctance to be examined. The left cheek was distended over a firm rounded tumour the size of a large Tangerine orange. It was not fixed firmly to the jaw, and the cheek appeared to move over it. "It had been growing for three years." The right cheek was similarly affected, the swelling being the size of a large walnut. On

everting the lip I saw a grey surface like a slough, but traversed with threads. The finger in the mouth then confirmed the suspicion that these "tumours" were foreign bodies between the cheeks and the jaws. With forceps I removed two balls, the larger of which, in the left cheek, was with some difficulty extracted through the mouth. The cheeks then hung down in flaccid folds. The second lower molar on the left side was displaced inwards, and its buccal fang was exposed almost to the tip. The lining of the cheeks was pale in colour and thickened. The "balls" consist of strips of calico very tightly sewn together with black thread. I have been unable to discover any motive for this curious freak, and in this it is on a par with many of the practices of hysterical girls.—*The Lancet*.

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### THE TEETH IN THE YOUNG ORNITHORHYNCHUS PARADOXUS.

IN the *Proceedings* of the Royal Society for February of this year is a paper by Edward B. Poulton, M.A., F.L.S., on the Teeth in the young Ornithorhynchus or duck mole.

Examining a series of consecutive vertical transverse sections through the head of a young individual, about 8·3 decimetres long, he found that large and apparently typical mammalian teeth were developing in the sub-epithelial tissues on each side of the roof of the mouth.

Teeth were present in the upper jaw in thirty sections through the head, and of these all, except the anterior sections, included some part of the eye. The teeth probably represent some part of the molar series in the higher mammals. Examining the sections from the front backwards, the first tooth appeared a little behind the anterior margin of the epithelial elevation, which appears to represent the developing horny plate which in the adult is the functional representative of true teeth. The teeth seem to form a tolerably straight line, extending internally to the horny plates. In the lower jaw the teeth appear to lie exactly beneath the developing plate. This may be the case in the upper jaw also, for the epithelium was in a damaged condition. Owing to imperfections in this part of some of the sections, he could not determine the exact number of teeth with accuracy, but they appear to be three in number on each side. The most anterior of these is of a different character from the others, and is apparently separated from them by an interval which



is longer than in other cases. The anterior tooth is the most developed and its apex extends so far towards the surface that it nearly touches the epithelium. It is a pointed cylindrical tooth, directed vertically downwards. The two posterior teeth have many cusps, and the two largest of these looked like separate teeth in sections.

The structure of the enamel cap is entirely normal, except that capillaries are certainly present in the middle membrane, intruding from without. The inner layer of long enamel cells is very distinct, and recently prepared sections have shown that enamel is certainly present. The dentine is quite normal in appearance and formation. The inner part of the dentine stains faintly in carmine, and shows the striation; the outer part does not stain, and appears homogeneous. There can be no doubt that these structures are characteristic mammalian teeth, and their appearance harmonises well with the results of Hertwig's researches on the structure and development of Placoid scales. His researches indicate that the mammalian teeth are probably in a more ancestral condition than any other organ possessed by the adult. They must have been derived at one time from Prototherian ancestors, and yet existing Prototheria were not known to possess them. Their occurrence in *Ornithorhynchus*, therefore, supplies the step just where it is wanted, and the fact that they are practically identical with the teeth of higher mammals is a further indication of the ancestral nature of these structures, for other higher mammalian features represented in the Prototheria are profoundly modified in the latter.

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### DENTAL HOSPITAL, EXETER.

THE Eighth Annual Report of the Committee of Management states that, having to vacate the old premises in Bedford Circus, it became necessary to seek other accommodation, and the Committee consider themselves fortunate in securing new ones in Castle Street; they are more commodious than the former ones, and provide a special room for the administration of anæsthetics, the want of which was previously much felt.

The Committee regret that there is a falling off in the annual subscriptions, more especially as, owing to its having become necessary to find fresh premises, considerable expense has been incurred in adapting them to the requirements of the institution,

and they earnestly appeal to the public for a generous support to meet the outlay.

The work done during the past year was as follows :—

Number of Patients	...	...	...	...	...	...	3,863
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#### EXTRACTIONS—

Children under 14	...	...	...	...	...	...	1,133
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Adults	...	...	...	...	...	...	2,419
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Under Nitrous Oxide and other Anæsthetics	...	...	...	...	...	...	465
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#### STOPPINGS—

With Gold	...	...	...	...	...	...	95
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With White Foil	...	...	...	...	...	...	11
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With Plastic Material	...	...	...	...	...	...	1,080
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Irregularities of the Teeth, Scaling, &c.	...	...	...	...	...	...	934
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Total	...	...	...	...	...	...	6,138
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The Committee have again to report an increase in the number of cases treated, the large number detailed above having only been once exceeded since the opening of the institution. They would also point with gratification to the proportion of stoppings to extractions, which is very large indeed, and compares most favourably with similar institutions elsewhere.

The receipts were £153 11s. 9d., and the expenses left a balance at the bank of £4 9s. 3d.

## VARIOUS GATHERINGS OF VALUE TO THE DENTAL PRACTITIONER.

By BEN DEL HER.

It has been noticed, no doubt, by the readers of our various dental journals that many intelligent observers and experimenters have strongly urged the combination of gold and tin as a very serviceable and otherwise valuable material for filling carious teeth.

*Experience*—the best of teachers—*has demonstrated these facts* :

That No. 2 tin-foil—two grains to the leaf—is better adapted to use with No. 4 gold-foil than thicker tin, in that it yields a *softer pellet* that will come into *closer juxtaposition* with the walls of any given cavity.

The writer has never been able to procure any No. 2 tin-foil at any of the dépôts, and was obliged to get his gold-beater, Mr.

Edward Kearsing, of Brooklyn, N.Y., to manufacture it for him, which he has done very acceptably for a long time. Many of the profession are well acquainted with the unsurpassed gold-foil manufactured by this gentleman.

That an oblong pellet of tin, made by rolling between thumb and finger a little smaller than the maximum size desired, then said pellet rolled in a piece of No. 4 gold-foil, so as to cover the tin over, from *three to four times*, uses but a minimum amount of soft gold and produces a filling very much like all gold work in colour, and, should the operator desire, he can more firmly unite and build cohesive gold upon such a foundation.

That to start approximating and cervical cavities with such a combination, the operator will have these advantages: First—A *much better preserving* stopping or filling in *soft or hard* teeth than with even *pure soft* gold. Second—An anchorage can be obtained almost *instantly*. Third—The operator can so easily finish the cervico-peripheral borders that even a careless operator would not be as likely to leave any *bulging* material to act as a shelf to hang up foreign substances to ferment and invite further decay. Fourth—with the aid of an indestructible and undissolvable *sticker*—noted below—no retaining pits are ever needed. Fifth—That with a cutting or trimming instrument, made much in the shape of a very *thin sickle*, made right and left, so as to bevel, one plain *only* constructed out of an excavator, will swiftly turn off any bulging of this compound filling and leave a *smooth* perpendicular junction between the filling and tooth.

There is some difficulty to finish a hard gold cohesive filling at some of these points.

It may be pleasing for some to know who have not had an extended experience with a combination of tin and gold that the whole forms a *hard, stone-like mass*. Where but a very small quantity of gold is used one might suppose that he was cutting into an old amalgam filling, as the colour and hardness so closely resemble the latter composition. We have not time to state how this is done, but simply to note the fact.

The sticker! Gentlemen will find that if they will obtain a drachm of Canada turpentine, *Abie's balsam*, Canada balsam or *balsam of fir* more commonly called, they will find it colourless or slightly yellow, and VERY TENACIOUS and STICKY! Dissolved in chloroform, it *unites* with any *clear dry surface*. Age does not injure its sticking

qualities. If several years old it will dry into a hard resinous substance, but easily dissolves in chloroform, less freely in ether. It will *firmly anchor* any foreign substance to a clean dry cavity. This sticker is incompletely soluble in bisulphide of carbon, glacial acetic acid, acetone, absolute alcohol and the secretion of the mouth. The writer has had an experience with balsam of fir over fifteen years. *It is reliable*, and of great value to patient and operator. If one has reason to believe that the septum is very thin between the pulp and proposed filling, then make one or two applications and allow the chloroform to evaporate, then one will have a most excellent *non-conductor* between pulp and any metal or other filling.

Let it be remembered, one does *not need* retaining pits, if tin and gold are combined and used as above.

Again, fillings started in this way are *firm* and *solid*, upon which cohesive gold *can be welded with perfect security and ease!* Make the solution in a wide-mouthed bottle. The reason is obvious.

It is well known that the plastics, the oxychloride and oxyphosphate of zinc, are apt to dissolve out sometimes quite fast at the cervical border of a cavity. To prevent this, make your approximating wall and neck border of your cavity out of red or white gutta-percha. You can build up a *thin* shell of gutta-percha after you have anchored it with the sticker. One can do just as he pleases with the percha. The latter will not dissolve away at the neck of the tooth, and the other cements will wear better where any attrition comes. Why! this sticker will bring sunshine, joy and money into any honest dental office! Try it!

The writer has been *sadly disappointed* in destroying microbes and bacterium found in the gum pockets around teeth, gum and alveola in Rigg's disease or pyorrhœa alveolaris by the use of bichloride of mercury—corrosive sublimate—in a solution of one to 1,000.

This form of mercury *will not* thoroughly dissolve in distilled water.

What little mercury there is dissolved will form an albuminate of mercury if there is the least shadow of blood present. Then the mercury becomes *totally insoluble* and *absolutely inert!*

One who has never gently forced that *pus detector*, the peroxide of hydrogen, between the teeth and gums of his patients will be surprised to see the number of mouths in which he will detect pus around the teeth.

Method used by the writer is, first, if there is pus present, by



carrying peroxide of hydrogen between teeth and gums. If pus is there it will be shown by bubbling up.

I have not found bichloride of mercury capable of killing the microbes in a less strength than three grains of bichloride in 1,000 grains of distilled water. One to 1,000 will not do it!

But even one grain of the sublimate will not wholly dissolve in 1,000 grains of water, much less three grains. Add *tartaric acid*, and the solution will be perfect. Tartaric acid will give the further advantage of *preventing* any blood that may ooze out from converting the bichloride into the albuminate of mercury, which is insoluble and inert so far as destroying the pus microbes.

Formula used: Bichloride of mercury, three grains; distilled water, 1,000 grains; tartaric acid, fifteen grains. Even five grains of mercury will not be too strong for some inveterate cases. Don't worry if patient swallows some, but caution not to. Don't imagine that microbes can be killed by looking at them, or by the use of 1 to 1,000 of the above.

It is well understood that Rigg's disease cannot be successfully treated while there are any foreign substances like tartar remaining around the teeth.

Many an incipient pulpitis can be arrested by taking one drop of tincture of aconite and reduce it by adding 200 drops of dilute alcohol. *Of this*, put five or six drops into one-half tumbler of water and give two teaspoonfuls at a dose *of the water* every hour till relieved. Sometimes a patient will suffer from pulpitis after having a tooth filled with a metal filling, due, perhaps, to thermal changes. The above treatment will save much annoyance to the operator.

A method of capping exposed pulps that has been very successful with the writer consists in leaving *all* the disintegrated dentine around the pulp. If much inflammation—pulpitis—it is controlled by topical applications of carbolic acid pura, to which has been added about ten per cent. of oil of cloves, and the constitutional treatment of aconite as related above.

Not at the time of operating, or subsequently, will any pulp allow even moderate pressure. To avoid this a concave cap of thin gold or silver is fitted over the pulp so as to rest on solid ground, beyond the possibility of there ever being any chance of pressure. *Room and soothing rest at all times* is what is necessary. If there is no inflammation, and one is sure his cap is secured, locked with gutta-percha, or with the sticker, then he can fill the cavity with that

material that will appear to secure the best ends. If a temporary filling is used, a permanent one can be substituted some months after, provided the original setting is not disturbed.

Should pulpitis ever set in within a year, instruct the patient to report *immediately*, not after some hours, but *immediately*; and then commence the aconite treatment, and in the large majority of cases a *complete victory* will be gained over that irritable pulp.

The cerebro-spinal nervous system is deeply invaded by the poisonous principles of aconite, the heart and *arterial capillary vessels* are so paralysed as to produce violent congestion and *inflammation* in any and every organ and tissue in the body that contains capillaries. The parts become *swollen, red, hot* and *painful*, with all the constitutional symptoms of phlegmonous inflammation, such as high fever, hard bounding pulse, violent thirst, great anxiety and restlessness.

Thus we find that aconite exerts its poisonous influence so profoundly upon those delicate *arterial capillary* vessels found in the pulp as to relieve their paralysed condition and remove their impacted blood congestion and inflammation.

Not only this, it has an *especial action upon the nerves* of the capillary vessels. That practitioner who really desires to save as many exposed pulps as he can will be surprised and delighted with his success through means as above cited.

The solution of balsam of fir should be made and kept quite thin by the aid of chloroform.—*Archives of Dentistry*.

### **BICHLORIDE OF MERCURY IN DENTAL PRACTICE.**

By LOUIS OTTOFY, D.D.S., Chicago, Ill.

*Read before the Southern Illinois Dental Society, April, 1888, and published in the "Dental Review."*

THE dividing line which is supposed to have existed between the animal and vegetable kingdoms is being rapidly obliterated, indeed it is now almost beyond question that there is not sufficient difference to justify a division into separate kingdoms. As in our observations we descend to the lower class of animals and plants, some of each are reached which have so few and slightly distinguishing features that they may be classified with either animals or plants, without in any marked degree violating the laws governing either species. To this vast class multitudes of minute living beings belong. The air and water is filled and peopled with them. In the lowest species of plants we find the various disease germs and spores, which have been

erroneously designated as animalcules, but are now properly known to be plants. The closer knowledge we now have of the life and habits of these germs has entirely revolutionized medical science and practice. Diseases whose origin has thus been discovered, and diseases whose management has been beyond human control, are now comparatively well understood. Undoubtedly the introduction of these germs into the system under various conditions and at various times lead to certain specific results. Nor is this less true of that portion of the human body more directly under the care of the dentist. It has been ascertained that the destruction of these germs and their exclusion from diseased parts, or indeed from the entire organism, is followed by favourable changes, and that usually a return to physiological conditions is the result. There are a number of chemicals and drugs which are said to be capable of bringing about these favourable results, and foremost among them is classed the bichloride of mercury.

The uses of this agent in dental practice are almost endless; it can be safely resorted to in all operations in which the result depends on the destruction of spores or microbes, which are now generally accepted to be instrumental in creating or maintaining diseased conditions. It can be used in solution of from one part in two hundred of water to one part in two thousand. A stronger solution than the former may not be safe, and weaker solutions than the latter are not supposed to be effective for the sterilization essential in dental surgery. The best method of having a stock solution on hand is to take 100 grains mercuric bichloride and add it to 1,000 parts of water at one time. This quantity requires the addition of alcohol, as the bichloride is not soluble in water to the extent of 100 in 1,000. This may be kept in a cool and dark place, and from it three solutions should be made, namely :

One of one part in	200
" "	500 and
" "	1,000,

in quantities regulated by the amount of each as may be required. The 200, 500 and 1,000 solutions are used only in small quantities, hence an ounce vial of each in the operating case is all that is necessary. To prepare them take from the pint bottle

Ten parts to 190 of water : makes one in 200

" "	490	" "	" 500 and
" "	990	" "	" 1,000.

A tumbler, bottle or small pitcher full of the latter should be made each day for the washstand to be used as it is, or it may be diluted with one-half of water, making a 1 in 2,000 solution to be used for purposes mentioned hereafter.

The dose of bichloride of mercury is from 1-20 to  $\frac{1}{4}$  of a grain. In the solution prepared the following will be the proportions :

Solution.	Per cent. of bichl. of mer.	In 100 drops.	In 50 drops.	In 10 drops.
One in 200 .....	$\frac{1}{2}$	$\frac{1}{2}$ grains	$\frac{1}{4}$ grains	$\frac{1}{20}$ grains
One in 500 .....	$\frac{1}{5}$	$\frac{1}{5}$ grains	$\frac{1}{10}$ grains	$\frac{1}{50}$ grains
One in 1,000 .....	$\frac{1}{10}$	$\frac{1}{10}$ grains	$\frac{1}{20}$ grains	$\frac{1}{100}$ grains
One in 2,000 .....	$\frac{1}{20}$	$\frac{1}{20}$ grains	$\frac{1}{40}$ grains	$\frac{1}{1000}$ grains

In opening into a cavity for any purpose whatever, and whether after or before the application of the rubber dam, the cavity having been dried should be flooded with the 1 in 1,000 solution. This solution should be used for sterilizing exposed pulps and disinfecting cavities when they extend near to the pulp. It is the solution *par excellence* to be used in implantation ; in it all instruments used in this operation should be dipped and the hands, towels, syringes and anything else which may come in contact with the tooth or mouth should be moistened with it, for success in implantation depends mainly on perfect sterilization and healing of the parts by first intention. The foregoing table demonstrates that the minimum dose of the drug is contained in fifty drops of the solution (1 in 1,000), hence no fear need be entertained in regard to the poisonous action of the drug, as that quantity would have to be swallowed or otherwise taken into the system in order to administer the minimum dose, and 250 drops to get the effect of the maximum dose.

The 1 in 200 and the 1 in 500 solutions are to be used carefully ; the former contains the minimum dose of the salt in 10 drops and the latter in 50 drops. These solutions are used principally in root-canals and the quantity and strength to be used should be governed by the size of the dental foramen, as is generally indicated by the instrument used or by the age of the patient. In cases where so-called immediate root filling is practised, the use of bichloride of mercury is essential. Its rapid and certain action in destroying disease germs and its preservative quality are brought into prominence. In teeth where the dental foramen is large, the 1-5 per cent. solution (1 in 500) should be used cautiously, while the 1-10 per cent. solution (1 in



1,000) may be used with impunity. The  $\frac{1}{2}$  per cent. solution (1 in 200) is used in root-canals whose foramina are small. But the principal use I have found for this solution is in painting those small irritable patches, which cause so much annoyance to those afflicted with them. These mucous plaques seem to have a certain course to run. I do not know to what causes they are due, or how they can be cured. They begin as a small irritating red spot, almost anywhere on the mucous membrane of the mouth or tongue, become gradually larger, generally about the one-twelfth of an inch in diameter, their surface is white or grey, and when in contact with the teeth, or when situated in folds of the mucous membrane, are very tender and painful; on the third or fourth day they are generally unbearable, and by the seventh or eighth have entirely disappeared. By touching these spots three or four times a day with the 1 in 200 solution, their progress is generally checked, though in some cases merely improved, but in either case they are less painful and disagreeable.

The 1-20 per cent. (1 in 2,000) solution is used for washing the hands, spittoon and instruments; the latter are dipped in it and rapidly wiped and rubbed clean, and when thus treated do not corrode. Of the forceps generally only the beaks need thus be treated. In this strength it may also be used as a mouth-wash, half of the solution and half of listerine, adding a few drops of the extract of white rose, jockey club, Mary Stuart or any other sold in the drug stores. These extracts and the listerine combined, to some extent at least, disguise the disagreeable taste and astringent action of the salt. These solutions have to be used thus without a definite knowledge of their exact action until it is definitely ascertained in what degree they are effective, and for what length of time they must be kept in contact with the parts to be acted on. For the present, at least, it is certain that no known substance has the properties of destroying parasites in so marked a degree as the bichloride of mercury. Its poisonous effect and its tendency to corrode instruments is the principal objection to its use; both of these can, in a measure, be overcome, and, with the exercise of good judgment, the use of bichloride of mercury will prove to be of much benefit to those who have not used it, or who have resorted to its use to a limited extent only.

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## Editorial.

### THE EDUCATION OF THE L.D.S.Eng.

THE education of the candidate for the License in Dental Surgery of the Royal College of Surgeons of England has frequently been set forward as being of a relatively high order. As a matter of fact, the curriculum certainly looks better than it proves to be. This statement is not made without observation and deliberation. It is a fact that is only too familiar to those who have been immediately concerned in the preparation of candidates for examination. And there is little doubt that the records of the College bear testimony to this condition of affairs. The weakness of the education centres in the examination. Those subjects in which candidates are not examined, the majority of students pay little attention to; and when the examiners do not go beyond a certain standard, the pupils are not prepared much in advance of what is admissible. That being so, the College ought to amend its position. The shortcomings have been frequently pointed out. No less than three Deans of the two Metropolitan Dental Schools have, at different times, written upon the subject. Yet withal, things go on as hitherto. Therefore, in again advocating urgently needed reform, indecisive phraseology is no longer expedient.

The faulty teaching is especially manifest in Anatomy and Physiology. These subjects are universally recognised as being at the very foundation of the study of the medical sciences. It is to the methods of examining and teaching these subjects that attention is now particularly directed. Until these methods are amended no remedy is apparent for the existing deplorable condition in which Dental Students are turned out by the General Medical Schools. Those Schools receive fees from the Dental Students and undertake to teach them Anatomy and Physiology amongst other things; but they do not send up the students for examination. The students have to be prepared for examination in those subjects by the Tutors of the Dental Schools; and it is the general experience of those Tutors to find that the candidates are sadly deficient in the knowledge of

anatomy and physiology. The remedy for this is that the General Medical Schools should be made responsible for the proficiency of their dental students in the subjects which they undertake to teach. To do that the College of Surgeons should require dental students to pass a Primary Examination in anatomy and physiology, and, if possible, in chemistry also.

That examination should be equal to the Primary Examination of the Conjoint Board. By thus dividing the dental examination into two parts, the General Medical Schools would have to send up their candidates for the Primary, just as they now send the medical students for the examination of the Conjoint Board. Consequently, a much higher standard of knowledge would be attained in those subjects; the student would be better prepared for the second or final examination; and the Tutors of the Dental Schools would not have, at least, two-thirds of their time taken up, as hitherto, in teaching (not "coaching") Anatomy and Physiology. Altogether there would be turned out candidates with a much higher knowledge of the medical sciences which the L.D.S.Eng. is supposed to possess. This matter, therefore, is clearly in the hands of the College.

All shortcomings in these respects must be laid to the credit of the College. Until some advance is made, such as is here pointed out, the College cannot, so far as its Licentiates in Dental Surgery are concerned, be credited with either the status of leader, or the dignity of *nulli secundus*.

To the dental section of the Board of Examiners in Dental Surgery of the College this subject is urgently commended. If they would only make representations to the Council of the College, there would be little doubt but that the reform indicated would be accomplished. The other three Corporations which grant qualifications in Dental Surgery have years ago taken the lead in this matter; and the Dental Profession naturally looks to those who accept positions of responsibility, as well as of dignity, to be ever vigilant in keeping their institutions abreast with the progress and requirements of the times.

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## PASS LIST.

### ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

DURING the April sittings of the Examiners for the Licence in Dental Surgery, Alfred Edward Donagan, B.A., Cambridge ; Edward John Montague Hodgkinson, London ; Thomas Gregory, Edinburgh ; Robert Keith Common, Edinburgh ; and Thomas Cuthill M'Kenzie, Edinburgh, passed the First Professional Examination.

The following gentlemen passed the Final Examination, and were admitted L.D.S.Edin. :—George William Welham, London ; Herbert Bycroft Ezard, Bath ; John Stephen Walker, York ; and Kevin Emmet O'Duffy, Dublin.

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## GOSSIP.

MR. AITKEN, continuing his investigations on fogs and mists, has determined approximately the number and comparative size of the particles of dust contained in a given quantity of air. That our atmosphere contains such particles is patent to every one who has seen a beam of sunlight streaming through a hole into a darkened room, and now we are told that air during rain contains 521,000 dust particles in a cubic inch. When fair, it contains 2,119,000 ; the air of a room where gas is burned, taken at 4 feet from the floor, contains 30,318,000 ; taken from near the ceiling it contains 88,346,000, while the air from a Bunsen flame contains in three cubic inches as many dust particles as equal the inhabitants of the world. The counting was done thus :—A known small quantity of dusty air was mixed with a known quantity of pure air. This was then saturated with moisture in a closed receiver. Within it, a square stage was fixed at 1 inch from the top ; it was lined into squares of 1 mm. The air was then supersaturated with moisture, and with the stroke of an air pump expansion was made immediately the drops fell upon the stage, so that they could be counted.

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In popular literature it is usually stated that the European oyster is at one time of the year of the male sex and at another of the female sex. Correctly stated, the *ostrea edulis* of Europe is hermaphrodite, and the ova are fertilised within the valves of the parents, but it does not, therefore, necessarily follow that they are self-fertilised. If they be, may not this be the cause of the English oyster being so scarce ? The American oyster—the Blue Points—so largely imported into the



British islands, is exclusively male or female, and fertilisation takes place in the open water. The Portuguese oyster is also of distinct sexes. Oysters feed twice a day. Their dinner hour, varying with the tide, is at the still moment preceding the ebb and flow. At no other time than these do they open their shells, but derive their nourishment from the fluid contained within their valves.

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THE investigation of the pupil of the human eye has at length been realised by Miethe. The method of momentary illumination by the combustion of magnesium enabled him to obtain photographs of his own pupil after it had been subjected to absolute darkness for forty minutes. The results, as shown by these photographs, were that the diameter of the pupil was 9 to 10 mm., while the iris was at the same time reduced to a width of  $1\frac{1}{2}$  to 2 mm.

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THE telantograph of Elisha Gray is said to be the subject of some important improvements. If report speaks truly, the sender of a message now writes it with a pen or pencil holder of peculiar construction, to which are attached two fine wires, whose other ends are connected with a holder of similar construction. After calling attention, the sender writes his message and simultaneously the same is written *fac-simile* by the pencil of the receiver. An outline drawing may also be transmitted and reproduced by the same instrument.

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It is stated in the *Bavarian Industrial Gazette* that aluminium may be soldered by the following process. The surfaces to be joined must be scraped or scratched perfectly bright and be covered with a film of paraffin; then a thin-rolled piece of soldering alloy, of zinc 5 parts, of tin 3, and lead 1, is placed on each, and each surface heated separately. The paraffin first melts and protects the bright portions from oxidation, then the alloy fuses and unites with the aluminium. The overlaid aluminium surfaces may afterwards be soldered as usual.

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AMONGST the inventions of interest of the past month appears the blow-pipe of Mr. Fletcher, of Warrington. Constructed on the old lines of the injector blow-pipe, it has some variations and additions which give it an advantage in the production of a high temperature never before attained. It consists of a tube whose delivery end is closed with a flat disc, in which is drilled a circle of holes, each large

enough to permit the passage of three or four cubic feet of oxygen per hour. This is surrounded by another tube, forming an annular space about  $\frac{1}{16}$  of an inch wide, and projecting beyond the disc of the jet  $\frac{3}{8}$  of an inch. The outer tube may be connected with an ordinary coal gas pipe, while the inner tube is connected with a bottle of compressed oxygen. After lighting the coal gas, the oxygen is turned on, and in the course of a few minutes, the inventor says, "an instrument consuming 40 cubic feet of oxygen per hour will fuse a hole through a 4-inch wrought iron steam pipe." So short and sharp is the heat that, with the assistance of wet cloths, polished work or wood lagging can be preserved without injury or mark, within two or three inches from a place where a heavy brazing repair has been done.

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IN a curious old book, published in London in 1702, entitled, "The Mechanical Powers; or, the History of Nature and Art Unveiled," there is a drawing of a rope tramway.

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ACCORDING to Dr. Tscherning, the crystalline lense of the human eye is placed obliquely with reference to the visual line, the centres of the curvature of its surfaces not being found on this line. This deviation causes a small degree of astigmatism, which is compensated by the astigmatism of the cornea, when it, as usually occurs, is more convex in the vertical than in the horizontal meridian.—*Comptes Rendus*.

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MR. HENSLOW has pointed out some interesting peculiarities in the catkins of some hazels, in which, besides bearing female catkins at the base of the male, the latter were proliferous, the basal branches being covered with staminate flowers. Does not this corroborate the conclusion arrived at by morphologists that female flowers are always associated with a relatively greater degree of vigour, or conversely, that an increased vigour produces female flowers, while normally nothing but male flowers would have appeared.

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DR. REUSH, discussing the phenomena connected with the fall of meteorites, says that they move with a velocity of forty to forty-five miles per second. When falling at full speed their surface may be supposed to be continually melting, perhaps evaporating. By friction of the air the molten surface is removed almost as fast as it is formed. In this way may be explained the fire-tail which is some-

times seen, and in the same manner is formed the smoke which on several occasions has been observed floating in the wake of the fire-ball. May not this latter appearance be the resultant of the expansion of the air in refilling the vacuum formed by the rapid motion of the meteorite, of which we have a simple example when the valve of the Westinghouse break under a railway carriage is opened.

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THE Auxanoscope is the name given to an instrument constructed by M. Trouvé for the projection of photographic drawings, medals, &c. It consists of two cylindrical tubes joined at a certain angle. One of these is provided with an electric lamp and parabolic reflector, the other contains an ordinary photographic lense. At the angle of union is placed the object to be projected on the screen. A four-cell bichromate battery furnishes the necessary light. New in name only, it is parlously like the Pseudoscope which many years ago was used at the Polytechnic of London, and by which the human face was thrown upon a screen while the subject was in the act of eating and drinking.

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TELEPHONIC communication seems to be moving with rapid strides in the United States. A message spoken in Chicago can be heard in Kansas city, distant 370 miles. The wire employed weighs 210 pounds to the mile. The transmitter is that of the Bell Telephone Company, used with six cells of a Calland battery.

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THE Forth Bridge, when completed, will have an arch the longest span in the world.

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THE Brooklyn Bridge, which is at present the champion, will ere long be compelled to take a second place. The Forth Bridge, when completed, will exceed it in length and span. The former bridge is 5,862 feet in length, and its greatest span 1,600 feet. The latter will be 8,091 feet long, while the span of its arch will be 1,710 feet.

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It is reported from Germany that the natural colours of flowers may be preserved by dusting upon them salicylic acid before drying them under pressure, the acid being brushed off after dessication, or the acid may be used in solution of one part to fourteen parts of alcohol. Red colours are said to be specially well preserved by the process. A similar plan, in which sulphurous acid is employed, has

been in use for many years in the establishment of Messrs. Schmidt, of Erfurt, whence come a large proportion of the bouquets of dried flowers to be seen in every house.

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THE deeply-rooted statement that the Mediterranean is a tideless sea does not appear to be according to fact. M. Heraud says that in the Gulf of Gabes, on the coast of Tunis, the tide rises six and a-half feet, and further, all along the coast, the rise is measurable.

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A NEW instrument of destruction has been devised by H. S. Maxim, in which a novel mode of expelling the projectile is utilised. In combination with the pneumatic principle of Zalinski, he uses the vapour of a hydrocarbon, such as gasoline. This compressed mixture is introduced behind the projectile, and the pressure starts it in the chamber of the gun. After it has moved a certain distance, the projectile uncovers a detonating fuse, an explosion then occurs, the air supplying the oxygen. The pressure is thereby increased about eight times, and amounts to about 4,000 lbs. on the inch. The detonator is said to be a very ingenious affair.

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THE opinion is gaining ground that the disease germs do not occasion fevers by their mere presence in the blood, but by certain definite chemical compounds—"ptomains," which they produce—these ptomains ultimately proving fatal to the germs themselves. This view probably explains why an animal which has once recovered from such a disease is proof against a second attack for some years. Time may show that it is possible to isolate these compounds, and perhaps to manufacture them, and also to use them as prophylactics against the attacks of disease germs.

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THE morphological notes of the John Hopkins University give us some interesting facts in the life of the hydroids. As in other animals, which pass through a metamorphosis, and which also multiply asexually—by fission—at any period of their life history, the new organisms so produced do not repeat in their own lives those stages which the parent organism had already passed. Thus, if the life history from egg to adult consists of a series of larval stages, A, B, C, D, E, and if, when the larva has reached C, it



multiplies by budding or splitting off the asexual progeny, do not pass through stages A, B, but go on with the series D, E, to complete their otogeny.

DR. E. PARMLY BROWN (New York) will give a series of demonstrations in London on Porcelain Crown and Bridge Work, commencing about the 20th of June.

The *Zahntechnische Reform* reports a case of death from chloroform narcosis in the dental chair. The case occurred at Luttich, Germany; the administration was authorised by a physician who had just examined the heart and lungs. The tooth was extracted before the final stages of narcosis had set in, and death took place immediately after the extraction of the tooth.—*Dental Review*.

WE regret to announce the death of Mr. George Joseph Sylvester, of the Tything, Worcester, which took place on April 30th, after a brief illness, which had kept him in the house for nine or ten days. The deceased gentleman, who was about 76 years of age, was well known to nearly every citizen, not only by reason of his professional attainments, but because of the interest he invariably manifested in general topics.

MONTHLY STATEMENT of operations performed at the two Metropolitan Dental Hospitals, and the Manchester Hospital, from April 2nd to April 30th, 1888 :—

				London.	National.	Victoria.
Number of Patients attended ...				—	2160	808
Extractions	Children under 14	...	...	550	323	677
	Adults	...	...	1022	536	
	Under Nitrous Oxide	...	...	721	745	56
Gold Stoppings	...	...	...	232	182	35
Other Stoppings...	...	...	...	819	663	66
Advice and Scaling	...	...	...	163	310	—
Irregularities of the Teeth	...	...	...	118	528	—
Miscellaneous and Dressings	...	...	...	377	315	176
Total	...	...	...	4,002	3,602	1,010

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**COMPOUND PLASTIC STOPPINGS.**

By L.D.S.Eng.

By compound plastic stoppings, I mean such as are composed of two or more layers of material, one of which, the endo-layer, being of some non-metallic substance, and the outer layer of amalgam. The double phosphate of zinc and alumina is admirably adapted for the former from its non-conducting properties, while the necessary conditions for the latter are to be found in an amalgam of gold, silver and tin. Amalgams of copper, or of copper and tin, may be used, but I give the preference to the triad of metals. There is a difficulty in so proportioning the constituents as to produce a compound which will not assume during its hardening a spheroidal or any other form, or undergo any change of structure involving contraction. Such a compound is made, and I leave it to others to work out, as I have done, the proper formula for it. Given the proper conditions, it is possible to make plastic a stopping whose conservative value shall equal any other filling, and further, by the plan about to be described in detail, it is possible to do so in cavities where it cannot be done, so far as my experience goes, by any other means.

There was a time when an operator who dared to use other than gold for fillings was looked at askance, something in the way of a tinker with a copper bit and soft solder. It was especially so in the land of the stars and stripes, amongst whose operators there used to be written a good deal of nonsense on this point, as well as much sound sense. That day has passed, and some of the best operators there are now advocating the use of amalgam and crying up the value of compound plastic stoppings. We have only to read their journals to learn that they consider plastic materials as some of the most valuable in the repertory of the dental surgeon. How comes it, then, that compound plastic stoppings have not received from the profession at large the recognition they deserve? Most likely they have disap-

pointed the expectations of those operators who, without looking closely into the causes of their failures, have cast the plan aside as untrustworthy. What have been the causes of the failures I can only surmise, but I feel sure they have been illative upon the conditions under which the fillings have been inserted and not upon the principles involved in a compound plastic stopping.

I do not arrogate to myself superior wisdom or profess a prevision above my fellow-practitioners. With them I have failures, but ever since the introduction of the phosphate of zinc and alumina, I have made these compound plastic fillings a study, and have seen them again and again through a series of years, and have rarely encountered a failure, except from some accident, such as a breaking down of the walls. I have come to look upon these stoppings as the only ones to be depended on in cases in which the dentine is softened over so large an area, and so deeply, that the only apparent chance of success lay in its entire removal, with the probability staring one in the face that the removal would uncover the pulp and necessitate its destruction, with all the attendant trouble; and supposing the cavity were so situated that this could not be done, then the pulp exposed loss of the tooth would inevitably follow. Success did not come suddenly. *Gradus per gradum* the necessary conditions were grasped and the treatment adapted to them until it culminated in a process which can be laid down for the guidance of others.

I think it was Dr. Miller, of Berlin, who wrote some months ago in the RECORD: "In cavities extending to the cervix of a tooth it is impossible to make a useful filling with oxyphosphate of zinc, because—the cementum and dentine being soft—moisture obtains admission through capillary action." I quote this from memory only, but whoever uttered the words, his chemistry was at fault, for no such compound as an oxyphosphate of zinc is known, but his conclusion about the value of phosphate stoppings, *per se*, in such cavities is sound. Probably he had not tried compound plastic fillings under the same conditions as I have, or he would not have written of phosphates in such condemnatory terms.

Quoting another writer: "With phosphates it is not possible in cervical cavities to keep out moisture, because the filling being constantly bathed with fluid it will find an entrance in spite of all the care lavished upon the preparation of the cavity. To the truth of this statement I give my consent, but the wisest of us may come to wrong conclusions if we do not consider *all* the possible

conditions. Those who hold the opinions of these writers have, with them, missed the one factor upon which success, I think, depends. It was just this factor I had recognised years before the articles were published from which my excerpts are taken. I had learned that complete dessication of the softened dentine was the means by which capillary action could be prevented, and that this state could only be ensured by the use of hot air. We may use pledget after pledget of cotton, steeped in ether, chloroform, absolute alcohol, or aught else, but never with them alone can be obtained absolute dryness, no more than we can make a plate of glass chemically clean by ordinary washing. There will still adhere to its surface a something which will prevent absolute contact with some fluids, and which will mar the desired results of the physicist. So it is with the dentine and a stopping; but bring about the proper condition and you will have perfect contact. This alone can bar the entrance of moisture by capillary action, but imperfectly dessicated dentine, even when coated with varnish, is powerful for mischief as a witch's cauldron.

I further learned that dentine when completely dessicated is far less sensitive than when it is moist. So marked is the difference that by the judicious use of hot air as much of the dentine may be removed from a sensitive tooth without pain as is really necessary for making a compound filling on my lines. The rest may be left, for, though it be soft, dessication with hot air will bring it to a condition fissured and corrugated, but no longer spongy.

It is in this state ready for the insertion of the non-metallic endo-layer. A fossiline lining applied with proper care will fill up every depression with a contact and adhesion so complete that capillary action cannot lend its aid to carry on the work of destruction, and the anærobic fungi will be—if they be so potent for evil as Dr. Miller says they are—deprived of the environment necessary to their growth, and therefore no longer able to do their share in the chemical change in which they are thought to play an important part.

The marked decrease of sensitiveness consequent upon dessication may have no physiological importance, but physically it cannot be overlooked, for it evidently interferes with the conductivity of nervous matter, perhaps by the abstraction of moisture which, we know from the researches of Matteuci, has much to do with the passage of an electric current through nervous matter. There is also



suggested the possibility that we may have in it the basis upon which may be founded the therapeutical treatment we generally adopt for the relief of toothache, using the term in a broad sense.\*

Dessication of the softened dentine and not its removal is, then, the fundamental principle upon which I work, and I consider it the *sine quâ non* of success. If it be properly done the phosphate lining becomes as an integral part of the tooth. There is a secret in mixing phosphate of zinc and alumina which must ever be kept in mind. There must be enough fluid used to ensure the double phosphate being formed, but more than this is a disadvantage, as the excess of acid phosphate is likely to prove a source of irritation to the tooth tissues. Unfortunately no formula can be laid down for this process; experience alone can guide the operator. I have used fossiline for so many years that I rarely fail to obtain a compound other than the proper one. It may be known by placing a pellet in the mouth two minutes after mixing, when there should then not be a trace of acid detectable by the taste.

The preparation of the cavity must not be lightly passed over. I frequently spend as much time in doing this for compound plastics as for a gold filling, and work upon the same lines. If carbolic acid be used as a disinfectant it must not contain glycerine, as the latter renders it impossible to attain complete dessication of the cavity. Peroxide of hydrogen yields the best result. At the cervical edge of the cavity I invariably cut a groove in the cementum, and take care that it is free from phosphate; so also with other edges. The conical edges I cut vertically, and after inserting the phosphates I carefully trim away every particle of it from the vertical edges and from the others also. That this may be done with certainty I prefer to use a phosphate tinted pretty deeply with carmine or with some of the oxides of iron. If the nature of the cavity renders it necessary, I very slightly undercut the cervical portion, but prefer that all overhanging portions be thickened and supported with this end lining. These

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\* Does not carbolic acid, tincture of capsicum and aconite, and others of the same class act primarily by the abstraction of the watery particles from the tissues to which they are applied, and so bring about a condition of the fibrillæ in which they no longer convey the peripheral impressions which carried to the nerve centres are recognised as pain? On this point further research may yield results of importance in curative science. The highest end of dental science is not yet attained, and would we climb to higher heights in our calling we must ever be in pursuit of a fulcrum which must be kept steadily in view.

steps are taken after the fossiline lining is sufficiently hard. It has been recommended by some operators to make the amalgam cap while the lining is still soft.

This plan is not a good one, as portions of the soft endo-layer are likely to be forced up and prove a source of weakness. Sometimes I find it necessary to use the rubber dam, but, as a rule, I find the double saliva tube with a tap, designed by Rowney of Derby, all that is required to ensure a dry stopping. So effective is this instrument where there is a good supply of water that I generally do lower gold fillings without having recourse to the coffer dam.

There is a source of failure in stoppings which, perhaps, has been overlooked by many. It came in with the dental engine. I have detected it again and again in cavities filled with gold, amalgam and other materials. It is so subtle that it may be overlooked by the keenest eye, until it is made patent by dessicating the cavity with warm air. Then there is seen the fine *débris*, the product of the bur. It fills every cranny and adheres so closely to the walls of a cavity, especially after moisture has gained admission to it, that no amount of wiping out with cotton, or even syringing, will completely remove it. The excavator alone is effective. Left *in situ*, it forms a porous layer or porous patches, through which the oral fluids find access and silently undermine the fairest work.

Amalgam for capping should be well mixed. I prefer to do the mixing in the hand rather than in a mortar. The finger is the best pestle. Too much rubbing should be avoided, as the metals are likely to become oxidized and, the oxide being diffused through the mass, make the amalgam porous. That this effect is produced is easily seen by submitting a thin layer of amalgam pressed between two slips of glass to a microscopical examination under a low power.

Beating the mass with the finger completes the amalgamation without the risk of oxidation. The amalgam should contain only just enough mercury to hold it together, and be introduced in small portions, each piece being well consolidated before another is added. When the cavity is full, the surplus is to be removed with a piece of cotton, and the surface contoured and then burnished with an agate or with the convex face of a spoon-shaped excavator until a uniform brightness results. This will tone down to a light grey when hard. In this state it may remain, or it may subsequently be polished with pumice, and should retain its brightness indefinitely.

There must be skill and neatness in all these processes as in making a gold stopping. It is by a grace in the exercise of our calling that we may hope to place our profession on a pinnacle whose top shall be level with that other profession of which ours is an offshoot.

## THE SUCCESSFUL TREATMENT OF PULPLESS TEETH.

*A Paper read before the Students' Society of the National Dental Hospital.*

By R. DENISON PEDLEY, L.D.S.Eng., F.R.C.S.Edin. (exam.) &c.,  
Assistant Dental Surgeon to the Hospital, and Dental  
Surgeon to the Evelina Hospital, Southwark.

It would be difficult to find a subject of greater interest to us, professionally, than that of the successful treatment of teeth, the nerves of which have been deprived of their vitality.

Such teeth are ever with us, demanding a considerable share of our time, skill, and patience; but by no means do we reap an adequate reward, owing to the uncertainty which constantly surrounds them. Whether it be due to diminished vitality, to pathological changes in the vessels and nerves of the periosteum, or both, it seems an undoubted fact that a pulpless tooth is far more liable to be a source of annoyance and discomfort to the owner than when the nerve was alive and well.

Much doubt exists as to the most efficient means of dealing with pulpless teeth, and if illustrations were needed, the innumerable methods and remedies advocated would very well serve.

The beginner, who seeks information outside our best text books, is perplexed beyond measure at the opposite views expressed, and only learns by long experience that different means are equally available.

We shall endeavour to treat our subject in as practical a manner as possible, drawing largely on experience as our guide. As a means of simplifying matters, we propose to make a very easy division:—

A.—Teeth whose nerves we destroy.

B.—Teeth whose nerves are already dead.

The conditions are somewhat different, so it is convenient to mention the principal steps necessary for adoption in each class and discuss them seriatim.

(A) Teeth whose nerves we destroy.

1. *Destruction of the Nerve.*—There seems to be very little doubt

that the application of Arsenic is by far the best means of destroying the pulp in the majority of teeth we meet with. Just a trace on cotton wool applied direct—whether used with Morphia or not matters very little. There are just two important points we have to bear in mind—the free exposure of the nerve and the sealing up of the cavity after its application, so that no arsenic can escape. Lack of attention to this latter point is often disastrous to the patient. In the former, we have found some use in Cocaine. A 5 per cent. solution, on a small pledget of cotton wool, placed over the exposure for a few minutes, often enables one to cut away without giving pain. Failing this, the application of nitrate of silver is very useful.

Where the nerve is not very irritable, or after rendering the surface insensitive by the above-mentioned means, it is often possible (before applying arsenic) to introduce the needle point of the hypodermic syringe and inject a few minims of the cocaine solution. In many cases we believe that the destruction of the nerve can be accomplished without pain. We would speak with some reserve, because it is a certain fact that many nerves are destroyed without pain by the direct application of arsenic, though it is quite possible that *their* vitality may have been considerably impaired by inflammation.

2. *Removal of the Dead Nerve.*—Here our real difficulties commence. Some authorities insist upon the entire removal of the contents of the fangs as well as the contents of the pulp chamber; others speak as if *they* always carried this out, and with ease.

That we remove all dead nerve is undoubtedly the best practice, for whatever we leave behind is liable to decomposition, and the evils which attend it; but that it is always possible we are not inclined to admit, and freely confess that many cases baffle us. It is comparatively easy in single-rooted teeth, as the incisors or upper bicuspid, but the outer fangs of upper molars, the roots of lower molars, and sometimes bicuspid, are often so curled at their apices as to render it practically impossible. The contents of the pulp chamber, and as much of the nerve as possible, should be removed by means of nerve broaches and flexible drills. It is absolutely essential that all instruments be perfectly clean before introducing into the tooth. After using, they should be dipped in strong Carbolic acid solution, and wiped over with carbolized oil. We should also, as a precautionary measure, wash and mop out the canals and pulp



chamber with Carbolic or Creosote, then thoroughly dry and the tooth should be filled at once.

Here we may well ask the question, Is it possible to treat a tooth successfully without removing the dead nerve? *It is possible in exceptional cases, and we will mention one.*

A country patient who was staying in town only for the day sought advice with regard to several aching teeth. It was found on examination that in the four upper incisors the nerves were exposed; arsenic was applied after excavating, and a small disc of court plaster placed over each application. The cavities were then carefully filled with G. P. stopping, great care being taken to avoid direct pressure on the pulp. The patient returned about nine months later; the stoppings were removed. The nerves (though long since dead) showed no signs of putrefaction, and were of a leathery consistency; they were removed and the roots were filled without giving further trouble.

This case illustrates the antiseptic qualities of arsenic as well as the safety with which it may be left in a tooth for a length of time.

3. *Filling the Pulp Chamber and the Nerve Canals.*—We have considerable choice in the number and efficacy of root fillings, where we have, as in this class of pulpless teeth, healthy canals to deal with. When we are sure of having removed the whole or the major portion of the devitalized nerve, it matters not whether we use gold or tin, wooden pegs, oxychloride, gutta-percha, or asbestos fibre, so long as they are properly introduced.

We have found that "Styptic colloid" in combination with oxide of zinc mixed on a slab with a spatula and introduced with oiled instruments an excellent stopping.

Wax and paraffin are somewhat uncertain, as they are liable to be taken up by the tooth substance.

Should there be a doubt as to any considerable portion of the nerve being left behind, it is better to fill the pulp cavity with iodoform (a preparation of which we shall have something to say later on) than to use cotton wool soaked in carbolic or creosote or any of the essential oils, as these fluids become absorbed and when the pulp chamber is opened up later on the cotton wool is stinking.

(B) **Teeth whose nerves are already dead.**

On opening the pulp chamber of a tooth, the nerve of which has been dead for any length of time, we may find the nerve absent entirely. It may be in a mummified and sodden condition, or, as frequently happens, in a state of putrefaction. Whatever the cause

may be, or whatever the condition of the nerve, we may be pretty sure of having an uncertainty to deal with, for the pulp chamber and nerve canal are generally in an unhealthy condition, often filled with septic matter. The periosteum has probably been subjected to repeated attacks of inflammation, and, as so often happens, septic matter may have escaped through the apical foramen, causing alveolar abscess, which may or may not have made its way out above or below the tooth.

The first part of our treatment is :—

1.—*To remove the decomposed nerve, and to render the roots aseptic.*

For the purpose of gaining free access to the nerve or whatever remains of it, it is of the first importance to open up the pulp-chamber with suitable drills, regardless of secondary dentine or calcareous deposits, for it is easy to imagine that the tooth is filled with these deposits when, on thorough excavation, decomposition is found beyond.

Before doing more we should use antiseptics, and here we may remark that they should be powerful, as our object is not to prevent but to remove decomposition.

All *débris* should be removed by washing out the pulp chamber with a solution of Condyl's fluid not sufficiently strong to stain the tooth substance.

The pulp chamber should then be thoroughly mopped out, and saturated with a solution of Hydrarg. perchlor. (corrosive sublimate). The form we use is gr. ii. or iii. to the ounce of rect. spirit. This is the most powerful antiseptic we have. In single-rooted teeth a flexible drill should be used for reaming-out and enlarging the canals. This not only facilitates the introduction of the filling but removes a layer of sodden dentine. Where this is not possible the roots should be carefully wiped out, great care being taken not to drive septic matter through the apical foramen. If this should happen, inflammatory mischief of a very severe type will ensue, causing an immense amount of pain and probably ending in the extraction of the tooth.

After removal of all decomposition and free use of antiseptics, the tooth should be carefully dried with hot air. It appears to us that writers do not lay sufficient stress on this part of our treatment ; and, though the hot air syringe we use is extremely simple, we believe there is much room for the exercise of ingenuity in the

construction of instruments which shall, without difficulty, give a continuous stream of air heated at a good temperature.

2. *Filling the Root.*—We have previously spoken of the uncertainty which exists after the treatment of teeth whose nerves have undergone decomposition, and for this reason we are not inclined to recommend the same fillings as used in Class A.

In Class A you have healthy teeth to deal with, and you may introduce stoppings which set hard with confidence that removal will not be required.

In Class B the teeth are unhealthy, and any stopping put into the nerve canals may have to be taken out.

The filling we require should fulfil two conditions. It should be permanently antiseptic and capable of easy removal.

Nothing has answered so well in our hands as Iodoform. A preparation of the same, which we shall describe as "iodoform paste," may be made as follows:—

Ol. Eucalypti 2 parts

Ol. Caryoph. 3 ..

Kreosote 10 ..

Into this gum mastic should be dissolved to saturation. After filtering through cotton wool, the solution should be thoroughly incorporated with iodoform in a Wedgwood mortar until it becomes almost a solid mass. The oil keeps the preparation moist. Kreosote, to a certain extent, disguises the smell of the iodoform. The gum holds it well together, and one is enabled to introduce about twice the quantity as when used dry.

With wisps of cotton as a medium, the pulp-chamber at least and the roots, where it is possible, should be filled. Over this a disc of card or metal, and then an ordinary tooth filling.

This preparation we have been using for between three and four years, and it undergoes no change in or out of the mouth.

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### ANOTHER PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Concluded from page 247.)

IN 1883 the dental profession in the province of Manitoba, and in 1886 that of the province of British Columbia, was duly incorporated—I presume, under somewhat similar Acts. In the other provinces—Nova Scotia, New Brunswick and Prince Edward Island—no such incorporation has yet taken place, and therefore in these

provinces, as a correspondent pithily puts it, "your registration is recognised, or, more correctly, anybody is permitted to practise dentistry."

I feel that in treating this subject I have not done it justice, but, inadequate as it is, it will suffice to show that our professional journals have long neglected a subject which ought to be of prime interest to practitioners in this country. I may be mistaken, but I do not remember to have come across even a single article descriptive of the conditions of the dental profession in Canada, and yet it is a subject which ought to interest, not merely for the intrinsic interest of the theme itself, but because of the light it sheds upon a question now agitating some of the most active, some of the most devoted, and also, it must be added, some of the most misguided minds in our profession.

The cry for so-called "Home Rule" in dentistry is one that may do much to rally the uncertain and wavering, and do much, if properly directed, to improve and enhance the present position of the dental profession in this country. It is well, therefore, for us to see and to recognise that our position is really not such a bad one after all when compared with a country like Canada, where the experiment of "Home Rule" has had the opportunity of fructifying during a period almost twice as long as that of our incorporate existence.

It has even been contended in a recent publication that such Home Rule would not only remedy the alleged unfair competition of medically qualified dental practitioners, but would effectually banish all dental quackery, charlatanism and unprofessional advertising. A brief sojourn in Toronto or Montreal, or I might even say, the casual inspection of a Canadian newspaper, will suffice to dispel such a hallucination. But when such a cry is so raised that it sounds in the ears of some, at least, as a mere futile shriek, it can do little good and much harm by alienating the co-operation of those who recognise that the day of dental reform is but yet at its dawn, and who are practical enough to recognise the utter impossibility of legislating backwards, or from the standard of a past epoch.

A mere glance at the results of dental legislation, whether in the provinces of Canada or in the different States of the United States, only serves to show how much cause we have for congratulation in the absolute identity of the dental laws in the several parts of the United Kingdom, while an inspection of the educational



institutions of these countries must convince us of the relatively greater strength of similar institutions in our own land from the practical uniformity of their dental curricula. In a country where all the provinces or districts have, or claim to have, within large limits, the same standard of development, it seems a mistake and a source of weakness to relegate, at any rate, professional education to the control of local government. The best interests of the body politic demand that higher education should be controlled by imperial or federal as distinct from provincial or state legislation.

To compare the great with the small, Canada, in the dental world, presents many analogies with the Eastern Counties' Branch of the British Dental Association. With a territory as large as Europe, if we exclude Norway and Sweden, which stretches from the Atlantic to the Pacific Ocean, with a total area of 3,620,510 square miles, with a total population of little more than as many souls as square miles,—at any rate, with a population considerably less than that of the metropolis of this country, the relative sparseness of the population to the extent of its surface, the relatively enormous greater distances which necessarily separate even the very largest centres of population (why, the population of the two capitals, Montreal and Toronto, is only about equal to that of Nottingham and Leicester !) must be tremendous obstacles in the way of efficient dental legislation. Yet, even in the face of such difficulties as these, the absence of imperial and therefore uniform legislative conditions has made itself felt.

In the United States, again, the conditions, if somewhat similar, are infinitely more advantageous, and it seems to me that the very existence of an institution, to which I have already referred in this series of articles, conclusively proves the existence of a large and widespread feeling on the part of our American *confrères* for the necessity of a uniformity of the dental curricula and the conditions of graduation, which necessarily constitutes the most important part of the still larger question of dental legislation. The National Association of Dental Faculties of the United States, now in the fourth year of its existence, meets annually, and consists of delegates from twenty-three dental colleges or dental departments of universities. This institution has done much and will yet do more to raise the standard of dental education in the several and, it is feared, too numerous teaching institutions in the United States, and yet it will take years upon years of similar good work before it can achieve anything like

the progress which resulted within a few months of the passage of "The Dentists' Act, 1878," by the action of that much-abused body, the General Council of Medical Education and Registration of the United Kingdom. I trust any American reader of these notes will not construe them into a kind of British "spread-eagleism," but ascribe them to an appreciation of the two main factors in producing this result, namely, a very different relativity of the population to the square area and the potency of the *indirect* representation of the dental profession of this country at the councils of this powerful body.

The happiness of our conditions has resulted in legislation and a system of registration, while unsatisfactory enough in many particulars, is yet infinitely more effective than any other similar institutions in any part of the universe, but more especially than those in which "Home Rule" in dentistry exists. It seems to me, therefore, that a consideration of the conditions of the dental profession in other countries entirely disposes of the advisability of dental "Home Rule" in this country, though it need not prevent us, as a profession, agitating for the remedy of that injustice which gives us registration without direct representation on the Medical Council, which controls that registration. Nor will this "Home Rule" question annihilate the gruesome spectre of dental quackery, though the fell results of its too vast proportions may be greatly diminished by education—the education of ourselves, the medical profession, and the public.

This mention of the necessity for the education of the medical practitioner as to what dental surgery has now become, and what it can do to aid him in his own more special work, enables me to call attention to a gratifying new departure on the part of one of the Canadian universities. The McGill University has recently appointed Mr. W. G. Beers, L.D.S., President of the Quebec Board of Dental Examiners, to deliver a course of lectures on Dental Anatomy and Surgery, specially designed to meet the requirements of the medical practitioner, thereby showing itself to be far ahead of most medical schools in the mother country by its recognition of the importance of this special branch of medical science. The name of Mr. Beers is well known from his able and intelligent conduct of the "Canadian Journal of Dental Science," which many of the older members of the profession must have missed for some years from the list of existing dental periodicals. It appeared as an independent quarterly journal for three years, but after the fourth year of its

existence (1877-79) was only issued at long intervals, owing to the failure in health of the editor. He, however, hopes soon to resuscitate the publication as a regularly improved monthly journal.

The stern conviction was at last forced upon us that life could not be all holiday-making, whether professional or otherwise. Although there was still much to be seen and done, no inducement could make our Professor give up his berth on the *Aurania* to join us a week later on the *Umbria*, so one morning we left the angel to continue his travels in Canada while the Professor and I made our way back into the States.

The first part of the journey can scarcely be called interesting, but later on it would be difficult to imagine a more picturesque and enjoyable railway journey than that by the long winding shores of Lake Champlain. Near the foot of the lake I left the train, which was to convey our too hurrying friend on to Boston, for the purpose of taking the more circuitous route to Albany, where I had promised to visit some old friends. As even the best of men must be awful hypocrites at times, I may be excused when, though sorrowful enough at heart, I smilingly shouted my last joke on American soil down the Professor's ear-trumpet, and left him with the somewhat unfriendly statement that once more I would be a free man, untrammelled by the imperious sway of his ever-present trumpet, which I had come to consider even a sterner emblem of autocratic power and dictatorial assumption than the monarch's sceptre.

The charming scenery through which I was now passing, and then the sudden appearance of the most charming of lakes, rich in all the blazing colours of the "fall," left but a sad regret that my friend was missing it all. The sail down Lake George, with all the comforting leisures of a well-equipped American steamer, on a bright sunny day at the end of September, is, indeed, a rare treat for any lover of the ever-changing landscape afforded by lake, forest and mountain. To be doomed to outward silence during one's passage through that lovely panorama, while one's whole inner-self was literally bursting to call the attention of at least one of his fellow-passengers to the beauty of it all, would rob it of half its charms. I think, therefore, that a part of my enthusiasm for the scenery of that part of the journey may be fairly ascribed to the unexpected companionship of a genial Irishman—abroad, a rollicking Bohemian; at home, successful, aye a fashionable, London medical practitioner. In fact, the Congress seemed to strew the path of



travel, wherever we turned, with the familiar faces of medical or dental friends and acquaintances.

After a pleasant two days spent in the family of a dental practitioner in Albany, where I had the opportunity of reviving fading reminiscences and possibly lapsing friendships formed during a too short and now somewhat distant period of assistantship in the capital of New York State, I hurried on to the Hub.

Here three too short days were very happily spent in the society of professional friends, mostly those of well-remembered student days. Here, too, at length, the Angel for whom I had vainly waited at Albany turned up once more. Less hurried by a freedom from my own social exigencies, he had wandered off the main track of the journey I have just described. Amongst other places, he "detracked" to visit Chasuble Canon, which he describes as being even more attractive and picturesque than Lake George.

As these jottings have assumed dimensions never anticipated, I shall not endeavour to describe the charming day spent in guiding my old Cambridge chum over the buildings and the halls of fair Harvard in that other and newer Cambridge. I found the old building once familiar to me as the medical school now tenanted by the dental. The new medical school is worthy alike of the University of Harvard and the City of Boston. To its present Dean, Professor Bowditch, one of the Associate Editors of the "Journal of Physiology," I had the opportunity of expressing my indebtedness for encouraging and helping me in my first attempt at dental research. I may mention that even vulgar curiosity alone might prompt a visit to Harvard Medical School, for there is to be seen possibly the most wonderful skull in existence. An Irish quarryman was *tamping* some blasting material with a ponderous iron crowbar, some 3ft. or more in length, when the charge suddenly exploded. The crowbar entered the skull by the roof of the orbit, passing out at the crown of the head. On being taken to an hospital this tough old customer agreeably disappointed everybody by living, despite this fearful wound. Indeed, he lived for several years and, for a part of that time at least, earned a lucrative and probably intemperate livelihood by exhibiting himself and his famous crowbar. In fact, the only noticeable after-symptom of the accident was, an unwonted susceptibility to the influence of alcoholic liquors. This remarkable case is often treated as a mere Yankee yarn, but it actually occurred, and was so well-known to the medical profession throughout the country that, despite the fact that



for some years he had been lost sight of by those most interested, on his death, I think some twelve years after, his skull was secured by a medical man away out in San Francisco, who presented it to the Museum of the Harvard Medical School, where it may now be seen with the entrance and exit of the implement well displayed, while beneath lies the historic crowbar, with the inscription carefully engraved on it, by direction of Professor Bigelow, soon after the date of the accident, so that there can be no doubt as to its authenticity.

Before leaving Boston I made a point of visiting a Harvard graduate who, I think, may safely boast of having the best and the most artistic dental office in the world. Dr. Bradbury's house has been specially designed to meet both professional and domestic requirements by Mr. W. Whitney Lewis, one of the most celebrated architects in Boston, which is now famous for the richness and the artistic nature of its more modern buildings. It occupies a prominent corner site on the principal avenue of the "West End," and is a handsome structure in the happy combination of red brick with a rich reddish-brown stone. The basement is semi-sunk, and contains a pleasant and well-lighted laboratory, kitchen, laundry, and a perfect wealth of the most modern conveniences. The first floor is entirely devoted to professional purposes. The porch in front of the main entrance must be a welcome refuge, whether from the heat of the sun or the inclemency of the weather. Immediately on the left of the entrance is a large and spacious reception room, well lighted by an enormous semi-circular window, which is also made to form a comfortable lounge. The room is extremely pleasant, and so artistically arranged that, although the furnishing is elaborate to the most minute detail, there is an entire absence of any ostentatious display for the sake of mere effect. As we pass from that room we cannot help stopping to examine the comfortable and spacious hall. On the left, close by the reception-room, are extensive suitable toilet conveniences for the use of patients, while on the right, commanding the entrance, is a small room for the lady secretary. Next to that is a small room with a dental chair only, used for consultations and examinations. At the other end of the hall, separated by a corridor and a screen, are four operating rooms, the largest of which is 12 feet by 9 feet, the others being slightly less in width. The light in each of these rooms is extremely good, and a fixed basin with running water in each. The arrangement of the doors is particularly ingenious and convenient; they do not swing on hinges at

all, but run, as it were, into a hollow in the wall, and are suspended from the top by small wheels which run on rails, so that but a touch suffices to open them without the usual jamming incident where the rollers are underneath. For use in hot weather, when an open door is better than a closed one, a pretty wrought iron swinging bracket, carrying a loose banner of tapestry, serves the double purpose of screening the view into the operating room, yet leaving space above and below for ventilation, and as the patient passes from the chair, screening the wash-basin, &c., in the corner of each room. All these rooms are ventilated by pipes carried to a large ventilating flue, heated by an earthenware smoke-pipe from the kitchen range. In winter the whole apartment is heated by indirect radiation. The fresh air, coming from the outside, passes over stacks of radiators placed in the basement, and is then carried into each room by independent flues. The radiators are heated either by steam or hot water by a device at once simple and effective, so much so that the whole house may be kept comfortably warmed all over with only two pounds pressure of steam, even when the thermometer stands at zero outside.

The house proper occupies the second, third and fourth floors, and has a separate entrance on the other street, so that it is entirely separated from the professional part of the building. The whole arrangements are exceedingly spacious and comfortable, and seem a happy adaptation of those luxuries, which we usually only find in the large modern hotels, applied to the requirements of private life.

Dr. Bradbury has kindly supplied me with elevation and plans of the house, which I had hoped to publish as an illustration to this paper, but unfortunately it has been found that the expense of its production would be too great.

We hurried on to New York by the Fall River line, thus enjoying the very height of luxurious night travelling. We had reluctantly to resist the temptation to go ashore at Newport, despite the attractions of this famous watering place and the invitation of one of the most congenial of our professional friends.

In New York we had only time for very few professional visits, as most of my time was taken up with Dr. Younger and seeing some of the results of his operations, to which, however, allusion has already been made in an earlier part of these notes.

Of course we had to give up one entire day to seeing the first competition for the American Cup by the famous yachts, the

*Volunteer* and the *Thistle*. We were a merry little party on one of these small but powerful tugs, so utterly unlike our own. I can only say that the sight of New York Harbour that day was a sight never to be forgotten. We had a splendid view of the whole race, or rather procession, for, alas! it was no race, and trust we bore the defeat, with which we could not help identifying ourselves, with proper demeanour.

"Nae man can tether time nor tide;  
The hour approaches, Tam maun ride."

In consequence of the tide, the hour of departure was an uncommonly early one (5 a.m.), so I missed the opportunity of having that magnificent "send off" with which New Yorkers usually honour departing friends, but, if I could not tether time I did something towards it, by ignoring the autocratic command of the Cunard Company to be on board at latest by eleven o'clock at night, and so, after spending a pleasant night with the boys in the weesma' hours, I found myself on board the *Umbria*, and only awoke to find that I was riding the billows many miles out at sea; and alone, for at the last moment my Angel was detained on urgent legal business.

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### THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE Ordinary Monthly Meeting of the above Society was held on the 4th ultimo, at 40, Leicester Square, Mr. DANIEL CORBETT, M.R.C.S., L.D.S.Eng., the President, in the chair.

Dr. W. ST. GEORGE ELLIOTT communicated a "Casual" on the subject of capsicum plasters. One of the most efficacious remedies, he said, in the treatment of facial troubles was that of capsicum or capsicum plasters. Many years ago they were introduced to the profession, and they have been largely used from that time to the present. Dr. Darby, of New York, brought out a capsicum plaster which had been recognised as one of the best, and he (Dr. Elliott) had employed them until, on one occasion, being out of them, he attempted to make some himself with satisfactory results. Their manufacture was very simple, chamois leather soaked in tincture of capsicum, with a 10 per cent. solution of cantharides, being all that was needed. The effect of the capsicum plaster Dr. Elliott considered to be far in advance of the ordinary application of aconite and iodine. He might add that home-made plasters, if the time ex-

pended on them were not considered, were cheaper than those to be had at the depôts.

The PRESIDENT then invited Mr. Van Praagh to make his communication on "Defective Articulation the Result of Cleft Palate."

Mr. VAN PRAAGH said: Whatever surgical skill was brought to bear on the healing of a fissure, or whatever comfort might be given to the sufferer by mechanical aid in the way of artificial palates, &c., one great congenital fault remained, viz., a painfully defective articulation, resulting, in some cases, in an absolute unintelligibility of speech.

From a practical experience of more than twenty years, he was prepared to contend that this difficulty of utterance in cases of all degrees of severity might be overcome by judicious and scientific treatment.

The great trouble they had to deal with was defective breathing; the air, instead of being forcibly expelled from the mouth, travelled about and found an outlet through the apertures of the nose.

The method he advocated was the adoption of gymnastic exercises of the jaw, tongue, and lips; exercises for producing vowel sounds, consonants, compound consonants, and all sound combinations distinctly. The tongue should be kept flat by means of an ordinary spatula, and the patient taught to respire properly through the widely opened mouth. Self practice before a looking glass enabled the patient to improve and control facial expression. Where the upper teeth failed, the upper jaw should do duty for the teeth, as for example in the production of the "t" and the "s," these, with the consonants "k" and "l," being most difficult of clear articulation. The cultivation of a slow utterance was insisted upon as of importance, and gymnastics of the respiratory organs were recommended as a means for reducing the nasal twang so often present in cases of cleft palate. Lastly, Mr. Van Praagh enforced the necessity of training in the recognised laws of elocution in order to obtain proper modulation of the voice and fluency of speech.

THE PRESIDENT, while fully recognising that Mr. Van Praagh was able to effect all that he promised in the treatment of cleft palate, at the same time doubted whether complete nasal resonance could be successfully produced by the method advocated alone, without first calling in the aid of the dentist. He quite realized, however, that Mr. Van Praagh's system would be of considerable service as accessory to the work of the dentist, and the Society was indebted to him for



giving them the benefit of his practical experience in a subject which he had made a specialty.

Mr. HENRI WEISS said that he thought Mr. Van Praagh's object had been to impress upon the profession the importance of lessons in articulation as supplementary to, and in connection with, the obdurator. Mr. Weiss made it his custom to enquire of a patient before changing a well-fitting obdurator whether he had attempted improvement in articulation by practising the production of sounds. His object in speaking was to point out that, though the skill of the dentist might produce a perfectly satisfactory obdurator, the patient might nevertheless be unable to produce any clear and distinct articulation. He took it that Mr. Van Praagh's view was that patients should be taught to speak, either by a professional elocutionist or by someone who had made the subject a special study, and the wisdom of this plan he had recently had the opportunity of testing in a case under his own care.

Mr. WALTER H. COFFIN stated that he had often heard practitioners express surprise and wonder that those for whom they had fitted carefully made obdurators had spoken not only not better but absolutely worse than before. He did not think sufficient emphasis had been given to the fact that not only did the normal apparatus in different people produce sounds in different ways, but more than that, people deficient in the power and capability to produce certain parts of speech would make grotesque attempts, in grotesque ways, to do so. The first result of the obdurator was to upset their previous methods of forming sounds, and it was perfectly obvious that if, after the insertion of the obdurator, their attempts were frequently worse than before, it was necessary to teach the patient how to adapt himself to his new circumstances.

The point for the dentist to recognise was that his responsibility did not end with merely placing a perfect mechanism in the mouth of the patient, and the results must not be judged by the mechanism only.

Mr. HERN said he should like to ask Mr. Van Praagh if he had applied his system in cases where staphyloraphy had been resorted to, and how far his method was affected by this operation.

Dr. MITCHELL was able to endorse Mr. Coffin's statements, and with reference to staphyloraphy, it only did what a well-fitting obdurator would effect.

Dr. W. ST. GEORGE ELLIOTT thought that the fact that there were

two distinctly different fundamental conditions of cleft palate should be well kept in view, viz., the congenital and the accidental ; in the latter case the difficulty in articulating sound would not be experienced to anything like the same extent that it would be if the cleft palate were congenital and the patient had never known how to talk. In such circumstances it would be necessary to teach him how to do so after the obdurator was fitted.

Mr. VAN PRAAGH having briefly replied, the President called upon Mr. F. F. BURGHARD, M.B., for his paper on—

“SOME CASES OF EPULIS.”

The paper consisted of a description of the history and treatment of three cases, with inferences and reflections upon them. The first case was that of a woman, aged 33, who observed a small lump forming on the outer surface of the lower jaw, opposite the left canine tooth. Upon its first appearance it was very soft, and within three months from that time it became liable to bleed freely upon pressure on the surface. Examination, after it had been growing for three years, showed it to be an ovoid tumour of a dark purplish colour ; soft to the touch, and a little compressible ; without fluctuation ; with no apparent pulsation ; and with no obvious abnormal vascularity. It was of the size of a horsebean, and situated below the left lateral incisor, canine, and first bicuspid teeth of the lower jaw, about a  $\frac{1}{4}$ -inch below the margin of the gum, so that it had not apparent connection with the teeth, which were quite sound. The surface of the tumour was but little ulcerated, except at one spot where there was a small mass of deeply congested granulations ; elsewhere it was rough and nasty. It was pedunculated. Fuming nitric acid was applied freely over the tumour, which sloughed away with the exception of a portion which, on account of its vascularity, gave rise to such severe hæmorrhage that Paquelin's cautery had to be resorted to a month later, when the growth was removed down to the periosteum. The operation was followed by limited superficial necrosis. The tumour had not recurred.

The second case was that of an out-patient at Guy's Hospital, a woman, aged 29, who had a small warty tumour about the size of a large pea on the mucous membrane of the gum below the first bicuspid on the outer surface of the lower jaw. It had been growing slowly for eighteen months, was dark bluish in colour, soft and compressible, and its free margin was covered with well-marked long

fine papillæ, which bled freely on manipulation. There was no connection with the tooth, which appeared perfectly healthy, and the growth did not spring from the periosteum. Under cocaine the tumour was removed by an elliptical incision round its base and down to the periosteum, without any great bleeding. After removal it became very flaccid; one section yielded a good deal of blood, and showed traces of spongy structure. Microscopical examination revealed hypertrophy of the papillæ and the mucous membrane to a considerable extent, beneath which there was a groundwork of fine fibrous tissue supported by large vascular channels with very thin walls. This nœvoid condition was not everywhere present. The growth was quite clearly circumscribed and there had been no recurrence of it.

The last case occurred in a medical student aged twenty-three. When examined the tumour had been growing two months, and was the size of a small bean. It had much the character of an ordinary fibrous epulis, and was situated in the right upper jaw opposite the canine tooth, with which it had no connection, nor was the periodontal membrane. When it was removed by the knife considerable hæmorrhage occurred. The microscope showed that the growth was of a soft fibrous character with many much dilated thin-walled bloodvessels.

Mr. BURGHARD proceeded to say that these three cases differed from the vascular tumours of the jaws described by Mr. Salter in three particulars: first, they had no connection, as Mr. Salter's had, with the teeth or periodontal membrane; secondly, the bone was not involved, so that the removal of bone recommended by Mr. Salter was not necessary; and thirdly, they were not associated with tooth irritation. He regarded them as closely allied to the vascular papillomatæ found upon the lip, and was of opinion that the best means of getting rid of them was by cutting pretty free of the tumour down to the periosteum; if this were done, the hæmorrhage would be very slight.

In conclusion, Mr. Burghard mentioned the case of an agricultural labourer aged 56, who first came under his notice in 1884, when he had a typical fibrous epulis on the lower jaw, opposite the right canine. This tooth had been broken short by a blow and had constantly ached since. The man was a great smoker of short clay pipes, by which the tumour was continually being made sore. Three years later he was admitted to Guy's Hospital and was found to be

suffering from an advanced stage of epithelioma of the lower jaw. The ulcer, as large as a florin, was in the site of the former epulis.

Mr. HENRI WEISS said it might be of some small interest to the author of the paper to hear of a similar case to those he had mentioned. The vascular growth existed opposite the first upper molar on the right side and sprang from no apparent cause. It became uncommonly vascular and painful and was about the size of an ordinary raspberry. He removed it, but it recurred. There was also severe hæmorrhage which he stopped. He again disposed of the growth by the aid of caustic potash, which burnt it quite away and there was no further recurrence; this was about four or five years ago. The only cause he could assign for the tumour was the presence of tartar in the mouth.

Mr. WEST, a few weeks previously, had a similar case under his notice. The tumour was in the right side of the lower jaw opposite the first bicuspid. It was found necessary to remove the right central and lateral incisor; the growth was then removed, its base being treated with nitrate of silver. It recurred, however, and after some few weeks it was discovered to be involving the right canine, which was then excised, together with a portion of the jaw in the region of the symphysis. The tumour, which was then lifted from its bed with the finger, was about the size of a large hazelnut; the alveolar process had been completely eaten away. There had been no recurrence of the tumour, and the patient had since been quite healthy. He should mention that the tumour was of a fibrous nature. The reader of the paper had said that sometimes these fibrous cells became sarcomatous: he was reminded of a case in point, in which a lady, the wife of a physician, was suffering with a tumour the size of a large pea, which upon removal and examination under the microscope was pronounced by her husband to be a sarcomatous tumour with simple cells.

Dr. W. ST. GEORGE ELLIOTT said that it seemed to him much to be regretted that the knife was so often resorted to in these cases. Some years ago he reported before the Society a case of epulis in which the surgeon had stated positively that removal of the periosteum was inevitable. Before this was resorted to, Dr. Elliott urgently requested the patient to permit him to try medicinal means, with the result that four applications of ethylate of sodium entirely removed the tumour, and there was no recurrence of it. In these cases ethylate of sodium would be found an exceedingly efficacious



remedy. In reply to Mr. Walter Coffin, he stated that the ethylate of sodium had the advantage of being less painful than caustic soda.

Mr. BURGHARD, in reply, said that although in certain cases and under certain conditions ethylate of sodium might be very useful, yet he did not think in cases of well marked cases of fibrous epulis it was likely to be of much service. Statistics showed that free excision was the only treatment to be relied upon. He had used caustic potash, and even after that the tumour had recurred. He thought the most efficacious way was to draw the defective tooth, and if the tumour had been growing rapidly, to remove a portion of the alveolar process. In a case within his own experience, portions of the alveolus had been removed, and the microscope showed that the alveolus itself was infiltrated.

After the usual votes of thanks, the Society adjourned until November.

### TENSION IN SURGICAL PRACTICE.

In a course of lectures on "The Causes, Effects and Treatment of Tension, as met with in Surgical Practice," delivered at the Royal College of Surgeons of England, by THOS. BRYANT, F.R.C.S., M.Ch. Univ.Dub., Hunterian Professor of Surgery and Pathology, and reported in the *Lancet*, it was pointed out that, when tension is very great, the venous and probably the arterial circulation through the tissues may be absolutely arrested. The nerves of the implicated tissues are at the same time stretched or pressed upon, and as a result pain is produced, and the severity of the pain is determined by the degree of pressure or stretching to which the nerves are subjected and the character and quality of the nerve supply to the part.

The pressure of tension, being centrifugal, acts all round. When the tension has been brought about by the effusion of inflammatory fluids, the effects described are aggravated, for the blood stasis which is encouraged by tension is well known always to exist in inflamed tissues. Tension consequently intensifies it.

Having referred to tension of tissues, as induced by the growth of solid or cystic tumours, or to what may be called slow tension and to tension as the result of sudden effusion, and more particularly of blood, to which class the term acute or rapid tension seems applicable, the lecturer then considered the subject of tension in its relation to inflammation. Under all circumstances, the presence of

pain in any local inflammation may be accepted as a sign and indication of tension and a call for its relief. When pain is increased at night—that is, when the patient is warm in bed and the circulation is acting at its highest force—the probabilities are that the affection is inflammatory, and that such increase in the force of the circulation which is promoted by warmth tends towards the production of tension or its aggravation.

And as in tissues that are inflamed, the tendency to blood stasis invariably exists, so, with tension acting upon them, there can be no surprise that this blood stasis, with all its evils, is greatly encouraged. With this blood stasis the probabilities of starvation of tissue are consequently much enhanced, and, as a result, their death is rendered more probable. To say, as students are taught to say, that death of inflamed tissue from tension is due to the cutting off of blood supply to the inflamed part is a fundamental error. The blood is in the tissues, but it is stagnant and not circulating. The death of inflamed tissues from tension takes place, as it does in a strangulated part, from the stasis of its own venous blood. It is a form of static, not of anæmic, gangrene—of death of tissue brought about by the stagnation of the blood in the capillaries, and not by a want of blood supply.

At the present day amongst experienced surgeons it may be said that the practice of giving vent to pent-up fluids in distended tissues is a primary surgical duty, and that this practice is fairly universal; but is it? Is there not even now a lingering dread in some surgeons' minds of incising or even deeply puncturing an inflamed tissue before suppuration has commenced? and have not many of us heard, when an incision has been made into such inflamed tissues as those just mentioned, something like an observation of pleasure that a fluid like pus has been seen to flow, as if to justify the act? Whereas the surgeon's pleasure should be where his duty lies, to give vent to pent-up inflammatory fluids before suppuration or other destructive changes have taken place. In his own practice, he, as a matter of routine, cuts down freely and immediately upon a finger the seat of thecal inflammation, and always congratulates himself that he has done so when only serum and blood escape, and no pus; for the existence of pus means destruction of tissue under all circumstances, a result which should be avoided.

The withdrawal of some of the distending fluid from the tense synovial or serous sac not only relieves pain with the tension of the

part, but at the same time frees the lymphatic, venous, and arterial circulation from the impeding effects of local pressure, and thus, by encouraging a more normal or healthy action of the vessels generally, tends towards the relief of the blood stasis, which is the one main important pathological condition of inflammation, and thus helps towards recovery. In the same way the contents of an abscess may often become absorbed by natural processes, after a sufficient quantity of its contents has been withdrawn to relieve tension.

Acute inflammation of the pulp of a tooth affords another illustration of the evil effects of pent-up inflammatory fluids upon surrounding parts, and of the severity of the local symptoms which must be attributed to such a cause. "In this case," writes Moon, "every factor for the production of agonising pain is present; the distensible pulp, largely supplied with nerves, undergoes vascular engorgement within an unyielding case—closed in at all parts except at the aperture of exposure." The trouble, if left unrelieved, soon ends in the death of the pulp, and too often in the extension of the inflammation to the periosteum of the jaw bone and surrounding parts, with its ultimate bad effects. How many of these consequences may be avoided by judicious treatment? Clearly the majority. Where the antrum of Highmore is involved in acute inflammatory trouble the same conditions are present. Tension, and as a result pain, are prominent symptoms, and these are only to be relieved by surgical action.

In concluding the first lecture Mr. Bryant said:—I should like from this chair to repeat what I have been long teaching, and what modern surgery has done so much to inculcate, that repair and inflammation are not only identical but incompatible; that repair is a physiological constructive restorative process, whilst inflammation is a pathological destructive one. When the latter attacks a wound that is healing by John Hunter's first intention, arrest of repair first appears, then disrepair, and the injured tissues will probably have to heal by granulation. And should, by some chance, inflammation attack a healthy granulating surface, the granulations will at once break down, and their molecular death, or the ulcerative process, take their place, the constructive process in both cases being destroyed and exchanged for the destructive and inflammatory. In the repair of all parts more or less destroyed by the inflammatory processes, inflammation must cease before repair begins. I would that this view of repair and inflammation were more generally entertained:

it would help clinical surgery, for it would lead all surgeons, in their treatment of wounds, to avoid and guard against every outside influence that can possibly give rise to the over-action which we call inflammation, whether such be the introduction or germination of microbes from without, or the effects of tension from within.

The influence of tension upon the repair of wounds, both as a cause of inflammation as well as a source of its persistency, supports, if it does not prove, the conclusions which the consideration of tension associated with other conditions has led me to draw. These conclusions may be expressed as follows :—That tension has a wide pervading influence in clinical surgery, as well as a decidedly marked effect upon the progress of disease. That it is the product of many causes, and that these, for clinical purposes, may be conveniently divided into the inflammatory and non-inflammatory. That it stands foremost amongst the causes of pain, and in inflammatory affections it is probably the chief pain factor. That where the causes are not inflammatory the tension to which they give rise will, if maintained for any time at a low level, or rapidly rising to a high level, excite inflammation in the tissues affected. That, where the cause is inflammation, the tendency of tension is to keep up or intensify the inflammatory action and strongly to encourage its destructive influences.<sup>1</sup> That tension in every degree has a destructive tendency, and the rapidity of the destructive process has a direct relation to the acuteness of the tension. That, as in wounds, the slightest degree of tension is injurious, so, in their treatment, the use of the drainage tube, or due provision for complete drainage, is a point of such primary importance as to relegate to a secondary position the mode and character of the dressing which is employed, since a want of attention to the efficient drainage of a wound under every form of dressing is followed by the same result.

If these conclusions be true, and I am satisfied that in the main they are true, two others ask for expression, the first being the value of local pain as a clinical sign of tension and an indication for local treatment, and the second expediency, if not necessity, of relieving tension as speedily as possible under all circumstances.

The second lecture had special reference to the effects of tension in bone when in a state of inflammation. Mr. Bryant concluded as follows :—

As I have applied the principle of practice I am advocating to



every variety of inflammation of bone, I may be allowed to summarise the whole in the following conclusions :

1. The pain associated with every form of inflammation of the bone or of its periosteal covering is due to tension, and the severity of the pain is a fair measure of its intensity.

2. In acute inflammation of the bone or its periosteum tension is the chief cause of necrosis ; and in the subacute and chronic forms it is a potent cause of their chronicity, as well as of the destructive changes which as a rule follow.

3. The relief of tension wherever met with, when the result of inflammation, is an important principle of practice which should be always followed. In bone the principle is most imperative, on account of the difficulties under which natural processes act in that direction, by reason of the absence of elasticity or yielding in bone, and by reason of the anatomical arrangements of its vessels which favour blood stasis.

4. To relieve tension in the softer tissues of the body, the local application of leeches, local or general venesection, acupuncture, aspiration, punctures, and incisions may be requisite ; whereas to carry out the same practice in endostitis or periostitis, subcutaneous or open incisions down to the bone, and the drilling, trephining, or aying open of bone by a saw, may be required, the choice of method having to be determined by the requirements of the individual case.

5. In the early or hyperæmic stage of inflammation of bone, before destructive changes have taken place, experience seems clearly to indicate that the relief of tension—as indicated by a dull aching pain, &c.—by means of drilling or trephining into bone may arrest the progress of the disease, and help towards a cure by resolution ; whereas, in the exceptional cases in which this good result does not take place, suffering is saved and destructive changes are limited.

6. In articular ostitis, of every kind and variety and in every stage, this mode of treatment cannot be too strongly advocated, as tending towards the prevention of joint disease.

7. In acute or chronic abscess of bone, diaphysial or epiphysial, the abscess cavity must be opened as any other of the soft parts, drained and dressed in the most appropriate way—the principles of treatment being the same in hard or soft tissues, although they are modified by the anatomical conditions of the parts.

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**CREOSOTE v. CARBOLIC ACID.**

THERE is a curious lack of comprehension, says *The Independent Practitioner*, of the wide difference between creosote and carbolic acid. Some of our most intelligent men use the terms interchangeably and as synonyms. The fact is, the two articles have little in common. As medicinal agents they are, or should be, employed for widely different purposes. And yet dentists frequently recommend the one when they mean the other. Creosote has but a very unimportant place in the dental pharmacopœia, while carbolic acid is, perhaps, employed more frequently than any other remedy. There are very few of the dentists who so commonly advise its use in their writings or speeches who even have it in their cases. Indeed it is not fit for exhibition in the operating room, because of its oppressively vile and penetrating odour. Let us review some of the characteristics of each, that it may be judged which of the two is best adapted to dental wants.

Creosote is obtained from wood ; carbolic acid from coal tar.

Creosote, when pure, is a liquid ; carbolic acid a solid.

Creosote will not coagulate collodion ; carbolic acid will.

Creosote will not produce a blue colour by reaction with muriatic acid ; carbolic acid will.

Creosote forms solutions with eighty parts of water, and with one-tenth of one part ; carbolic acid with twenty parts.

Creosote is not a cauterant ; carbolic acid is.

Creosote is a narcotic ; carbolic acid is an irritant.

Creosote is an oil ; carbolic acid is a phenylic alcohol.

Creosote has for its formula  $C_8 H_{10} O_2$  ; carbolic acid is composed of  $C_6 H_5 HO$ .

Creosote is a soothing application to ulcers and for putrid sore throat ; carbolic acid is exceedingly irritating.

Creosote is styptic and astringent ; carbolic acid is not.

Finally, and most important, creosote is not a germicide or a disinfectant at all, while carbolic acid is one of the most powerful with which we are acquainted.

Will not dentists take note of these differences, and use and recommend the two drugs intelligently? Medical men who know the characteristics of each are not impressed with our chemical and pharmaceutical lore when they hear us prescribing creosote for the septic canal of a tooth.

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### PYÆMIA OF DENTAL ORIGIN.

By ARTHUR W. W. BAKER, M.D., F.R.C.S.I., Surgeon to the  
Dental Hospital of Ireland

*(Read before the Section of Pathology in the Royal Academy of Medicine in Ireland, on June 1, and published in the "Dublin Journal of Medical Science.")*

As pyæmia from dental causes is not very common, or perhaps has not been frequently recognised, the notes of a case which came under my own observation are, I think, deserving of record. Before, however, detailing my own case, I shall refer to some of the scanty literature on the subject.

In the recent edition of Tomes' "Dental Surgery," the author refers to seven cases of acute and chronic pyæmia of dental origin which he has collected from various sources, all of which proved fatal. Two of these, however, in my opinion were, strictly speaking, not pyæmic, as we now understand the term. In one, extension of an abscess connected with a lower wisdom tooth produced some severe unilateral glossitis, and mechanically suffocated the patient. In the other, splintering of the lower jaw in the removal of a tooth gave rise to an abscess, which found its way up the ramus, and through the foramina, ovale, rotundum, and spinosum, into the cavity of the cranium, where meningitis ensued, of which the patient died. The remaining five cases may fairly be classed as pyæmic, and as such deserve our attention, for they point to the fact that alveolar suppuration cannot always be treated as an affection of no moment, but may sometimes be attended with even fatal consequences. Unfortunately, details are wanting in the cases recorded by Mr. Tomes, upon which we might with advantage generalise.

Dr. R. J. Porre, at the International Medical Congress held at Washington in 1887, brought forward some cases of chronic pyæmia of dental origin, in all of which there was, fortunately, a happier termination than in those recorded by Mr. Tomes. Dr. Porre gives the following account of one of the cases observed by him :—The patient, male, good constitution and habits, suffered for the last thirty years from neuralgia, besides having constantly recurring furuncles and eruptions in various parts of the body, which would often for months become running abscesses. He experienced burning and itching eruptions of hands and feet, which would finally change to stubborn ulcerations. His bowels were either stubbornly constipated or exhaustingly loose. He suffered

from frequent rigors and febrile attacks of varying intensity, profuse night sweats, retention of urine, serious constrictions of the bowels and urethra. Lancinating pains darted from the maxilla of right side to bowels, bladder, limbs, hands and feet, or to whatever part was locally affected at the time. This latter peculiarity, together with the discovery of a little pus exuding from the locality of the wisdom tooth, led to a final correct diagnosis of his case. The tooth referred to was extracted, and a speedy and complete recovery followed. Dr. Poore also read the notes of ten similar cases, which all yielded to the simple remedy of removing the offending tooth.

Mr. Frederick Eve, Curator of the Royal College of Surgeons, England, in a recent communication to the Odontological Society, whilst noticing the fact that in periodontal abscess, although the pus directly gained access to the bone, serious consequences rarely followed—yet related the case of a young man who had been troubled by an abscess in the region of the fangs of a second molar tooth. He attended the funeral of his grandfather, caught cold in the tooth, and died in three weeks of pyæmia.

Some interesting experiments on mice are at present being carried out by Dr. W. D. Miller of Berlin, by inoculating them with the material obtained from gangrenous pulps. As these experiments are not yet concluded, it would be premature to do more than allude to them here; but from Dr. Miller's recent communication to the *Dental Cosmos*, he is evidently quite alive to the importance of investigating this source of pyæmia.

The following case occurred in my own practice. I am happy to say that it was not fatal, and that I succeeded in curing the patient without sacrificing the offending tooth.

CASE.—Mrs.—, aged thirty-three, widow, consulted me in the beginning of November, 1887, about her first left upper molar tooth, which had given her pain from time to time. The patient appeared to be in excellent health, and presented no evidence of constitutional taint. She stated that the only illness she had had, excepting, of course, her confinements, was a severe attack of scarlatina at twelve years of age, which was followed by general dropsy. At the age of nineteen, the first left upper molar (the tooth about which she consulted me) was filled; this resulted in an alveolar abscess over the tooth. Ten years later she had another rather acute abscess in the same place, which was followed at once by a small abscess on the



fourth toe of the right side ; then small abscesses broke out over other parts of the body at the same time, the tooth being the seat of more or less uneasiness. Early in the spring of 1887, she suffered from an abscess in the right ear, which by the medical attendant was thought to be connected with some tooth. About a week previous to consulting me, she had a recurrence of the abscess over the left upper molar ; this was followed by a small pimple on the back of the right forearm, which at the time of her visit presented the appearances of a small pyæmic abscess. Viewing the case as one of chronic pyæmia, having its origin in the suppuration about the roots of the molar, I decided to try and save the tooth, and in so doing, if possible, to cure the pyæmia.

The tooth I treated by removing all that remained of the dead and decomposed pulp, cleaning out the roots thoroughly, syringing them first with weak carbolic lotion, then with absolute alcohol. The roots were finally dried with hot air and injected with a solution of iodoform in ether, and the filling of the tooth was completed at a subsequent sitting. There was a swelling, about the size of a small marble, on the gum over the buccal roots of the tooth, corresponding to the site of the alveolar abscess to which I have alluded ; this I laid open freely, and allowed it to heal from the bottom. The fluid which escaped from this swelling was more like cystic fluid, such as is frequently found as the result of chronic inflammation round the roots of teeth, than true pus.

It is now more than six months since I treated this case, and being interested as to the result, I have kept the patient under observation. She has had no further trouble with the tooth, and the metastatic abscesses have ceased. That the tooth was the source of the poison, to my mind, appears extremely probable, both from the frequency with which the periodontal abscess was succeeded by an abscess elsewhere, and the fact that the small abscess, which was situated on the patient's forearm when she came to me, subsided more rapidly than any previous abscess on treatment of the tooth ; and no abscess has since then appeared.

I am not quite clear as to the explanation of why the pyæmia evidenced itself always on the right side, while its dental origin was on the left. That more serious symptoms did not present themselves in this case was most likely due, as pointed out by Mr. Watson Cheyne in his recent lectures on "Suppuration and Septic Diseases," to the small dose of the poison.

The history of this case, taken in conjunction with the others which I have quoted, shows the importance of investigating the condition of the mouth in any case of pyæmia where we are in doubt as to the source of the disease.

### PARALYSIS OF FIFTH NERVE

AT the meeting of the Ophthalmological Society held on June 14th, Dr. W. J. COLLINS showed a case of paralysis of all parts supplied by the sensory branches of the right fifth nerve. The muscles of mastication were unaffected. There was no history of syphilis and no cerebral symptoms. The patient had suffered from severe pain in the anæsthetic parts for eight months, and the sight of the right eye had failed. There had been no herpes and no conjunctival or corneal affection whatever. There was diffuse opacity of the right lens; the left eye and side of the face were normal, the vision was good. Dr. Collins considered that the lesion was located somewhere between the root of the nerve in the pons and the subdivision of the Gasserian ganglion. The case conflicted with the views of Snellen and others respecting trophic nerves. Here the lens, non-innervated and protected from foreign irritants, suffered, while the highly innervated and anæsthetic cornea retained its pellucidity, notwithstanding eight months' habitual exposure.

### EXAMINATION QUESTIONS.

#### ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AT the Examination for Diploma in Dental Surgery, on the 18th ult., the following questions formed the "papers":—

#### ANATOMY AND PHYSIOLOGY.

1. Describe the Muscles of Mastication, and give their action. Mention their vascular and their nerve-supply.

2. Which are the depressor muscles of the Hyoid bone? Give their relations (excepting those of the posterior belly of the Omohyoid), and mention their nerve-supply.

#### SURGERY AND PATHOLOGY.

3. What are the causes of a stiff Jaw? Give the diagnosis and treatment of each.

4. Whilst a patient is under Nitrous Oxide Gas for extraction of a tooth, the gag breaks, and a piece of it becomes impacted in the Glottis. What would you do? Detail the order of your procedure.

#### DENTAL ANATOMY AND PHYSIOLOGY.

1. What differences characterize the teeth of various races of Mankind? Judging from dentition alone, what inferences could be drawn as to Man's natural food?

2. Describe the structure, function and distribution of Cementum :—(i) In Man ; (ii) Ungulata ; (iii) Rodents.

3. Describe specimens A, B, C.

#### DENTAL SURGERY AND PATHOLOGY.

1. Give an account of exostosis of the alveolar portion of the Maxillary bones.

2. Give an account of Transplantation of Teeth.

What are the dangers and sources of failure?

3. What are the conditions which justify the use of spiral springs for the retention of artificial dentures?

What are the precautions necessary for their successful application?

#### GOSSIP.

It was stated by Mr. Beaumont, before the members of the Microscopical Society, that he had observed the development of an amœba into an actinophrys, and then into a diffulgia, and lastly into an arcella.—*Nature*.

THE condition of timber known as "dry rot" has within the last three years been closely investigated by Poleck and Hartig, who have discovered the necessary conditions for the germination of the spores of the fungus *Merulius lachrymans*, which is the cause of dry rot. One is the presence of an alkali such as ammonia, and as it is found in cellars, stables and other outhouses where alkaline emanations from the soil or elsewhere can reach the timber, there is a particularly favorable circumstance afforded for the germination of the spores. The other conditions are provided by a warm, still-damp atmosphere, such as exists in badly ventilated cellars and corners, and beneath

the floors of many buildings. This fungus is named lachrymans, or weeping, because of the drops of fluid which, like crystal tears, hang from its areolated surface.

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THE results of the experiments of Mr. Crookes in fractional precipitation of metals, which a few months ago gave the warning note, that possibly many of the so-called chemical elements were really compounds, are now being explained, without disturbing the principles of chemical philosophy; by supposing the precipitants to differ only in their basic properties, consequent upon the difference in the size of their atoms; as if a powder passed through sieves of different degrees of fineness became separated into particles, whose sizes determine their physical properties—a species of allotropism.

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THE Brochs or round towers of Celtic Scotland appear to have been simply towers of defence possessed of large capacity for accommodation, and of almost unassailable strength in the methods of warfare of their time. They are thought to be post-Roman subsequent to the 5th century. Articles discovered in them are usually of the iron age type. Pagan interments, sometimes with cremation, were made in them.

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THE discovery of boulders in coal seams has raised a difficulty concerning the usually accepted doctrine that beds of coal have for the most part been formed of the remains of trees and plants that grew on the spot where coal exists. It is now thought that the immense beds of vegetable matter could never have grown *in situ*, but that they have been carried down from mountain sides by avalanches. Examples of this kind may be seen in the lakes of Austrian Tyrol, of which the Aachensee furnishes the most striking. In its deep clear water hundreds of trees may be seen in an upright position, which have become soddened with water and then have sunk to the bottom. The fjords of Norway also afford examples. If this theory be correct, the presence of boulders is easily accounted for.

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PROFESSOR KAST, of Freiburg, announces his discovery of a new opiate. He has named it Sulfonal. It is produced by the union of ethylmercaptan with acetone. It forms crystals without taste or



smell and is very soluble. It produces sleep in invalids, particularly in nervous people and in those affected with heart disease, without altering the pressure of the blood in any great degree.

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THE demonstrations of Mr. Boys on the physics of a soap bubble have invested one of the commonest things with an interest sufficient to arrest the attention of every lover of science, and they who can descend to the puerilities of the soapbowl and tobacco pipe, may learn some of the higher secrets of nature. To many, some of these secrets are not new. They may have watched a string of these fairy globes bounding over a smooth surface under a slight breeze, like things of life inflated with joy, but they do not in their course ever actually touch the surface. This is one of the secrets which Mr. Boys has wormed out of the bubbles, and he shows further, that when two bubbles are brought near to each other, actual contact does not take place, a thin stratum of air intervening which cannot be pressed out. Why, he does not say; but probably the viscosity of the air is the cause, even as a film of air adheres to a metal plate. Further, Mr. Boys shows that, when a second bubble containing coal gas is blown within a bubble containing air, the lighter will ascend carrying with it the heavier, and yet there will not be contact even at the highest point. The principle of the formation of Newton's rings by the varying thickness of a strata of air contained between the convex surface of a plane convex lense and a plane surface has been applied to prove that the inner bubble is not in contact with the outer. Were it in contact a black spot would be seen at the point of contact, from the entire non-reflection of light, but as colour is reflected, it is demonstrated that there must be a layer of air between the outer surface of the inner bubble and the inner surface of the outer bubble.

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AMONGST the soil makers—in damp woodland soils and along rivers—the cray fish *Astacus fluviatilis*—plays an important part. Professor Shaler estimates that one of these crustaceans will bring up half a cubic foot of earth to the surface in a single season.

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It is proposed by M. Bandsept, in dyeing or printing tissues, to use solid powders in a finely divided state instead of solutions, the powder to be projected against the cloth by a jet of compressed air or superheated steam.

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It is stated that true mammalian teeth have been discovered under the long plates of the mandibles of the *Ornythornicus paradoxus*. This fact, if it be one, suggests the possibility that the monotremata may be degraded mammals, and not advancing reptiles. Professor Mivart holds the contrary opinion, and thinks it likely that the monotremata have become mammalian, but not along the line which was followed by the higher mammals, and that the idea that the *Ornythornicus* is a transition form between reptiles and birds is inaccurate.

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SIR HENRY ROSCOE, in his report on the chemical treatment of sewage, points out that amongst the natural processes the most important is the change produced by living organisms. This change is twofold : one being due to the action of organisms requiring free oxygen for their growth, with the result that the organic matter is rendered inoffensive ; the other being due to the organisms which thrive in the absence of free oxygen and give rise to offensive products. The difficulty is to preserve the one while preventing the growth of those yielding offensive exhalations. For the products of putrefactive change so readily absorb free oxygen, that when they pass into a clear river they deprive it of its dissolved oxygen and the healthy organisms cannot grow.

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WITH regard to the place where atoms come into existence, it seems almost certain that if their existence has had a beginning, it has begun at the very edge of the protyle or the confines of the ponderable universe and that their subsequent migrations have always been inwards. In dynamical language, every new position into which an atom can glide must be from a position of higher to a position of lower potential. If the atom has had a beginning, it must therefore have been where the potential is highest, *i.e.*, on the confines of the ponderable universe, and if it come to an end, it must be where the potential is lowest, *i.e.* in the centre of overgrown stars, so that the extinction of the central part of a star when it becomes overgrown is that which puts a limit to the size a star can attain by attracting to itself surrounding matter.

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MR. JOHNSON STONEY, M.A., F.R.S., says : It may be further stated that some atoms must have been formed at or beyond the

limits now occupied by any ponderable matter. It is also certain that their extinction, if it arrives at all, must overtake them in the position of lowest potential which they can reach, and that the position of lowest potential is at the centre of the largest star. It is a great recommendation of this hypothesis that there are processes in nature which convert radiant energy into the energy stored up in ponderable matter; that it relieves us from the vastly greater improbability of the only alternate hypothesis that the entire universe will become motionless and inert through the equable distribution or complete dissipation of its energy.

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MR. W. CROOKES, F.R.S., in his presidential address to the Chemical Society, said: "If we may hazard any conjectures as to the source of energy embodied in a chemical atom, we may, I think, premise that the heat radiations propagated outwards through the ether from the ponderable matter of the universe, by some process of Nature not yet known to us, are transformed at the confines of the universe into the primary—the essential—motions of chemical atoms, which, the instant they are formed gravitate inwards, and thus restore to the universe the energy which otherwise would be lost through radiant heat." If this conjecture be well founded, Sir William Thompson's startling prediction of the final decrepitude of the universe through the dissipation of its energy falls to the ground.

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REGARDING the oxygen blowpipe, Mr. Fletcher writes:—"Allow me to correct some errors in reference to my new blow-pipes on page 276 of your last issue. These blow-pipes are similar to the ordinary pattern, except that the oxygen jet is made with a ring of fine holes and is set deeply in the gas tube. They are made in three sizes, to consume respectively about 7, 20 and 40 cubic feet of oxygen per hour. The latter size will fuse a hole through a wrought iron or steel plate  $\frac{1}{4}$ -inch thick in about forty seconds, and will penetrate a steel armour plate one inch thick in three to four minutes. These blow-pipes are not of much interest to the dental world, but their discovery has led to an advance in laboratory furnaces which may assist in simplifying the production of continuous gum work."

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THE Dental Hospital of London, Leicester Square, has received notice that a legacy of £2,000 has been bequeathed to it by the late Mr. Capel Carter.

MR. CHARLES F. FORSHAW has been appointed Dental Surgeon to the Ilkley College, Yorks.

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IN future the examinations for the L.D.S.Eng. will be held in May and November. The third examination, hitherto held in February, will be discontinued.

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AT the annual meeting of the Southern Counties' Branch of the British Dental Association, held at Southsea, on the 23rd ulto., the following resolution was submitted to the meeting by Dr. George Cunningham: "That this Association is strongly of opinion that, in the interests of the State, some provision should be made for attention to the teeth of our soldiers and sailors, and that the Special Committee appointed by the B.D.A. for that purpose be encouraged to bring the matter urgently before the proper authorities."

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THE Distribution of Prizes to the successful Students at the Dental Hospital of London will take place at eight o'clock on Friday, the 20th inst., at Leicester Square, the Right Hon. the Earl of Lathom, P.C., presiding.

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DR. HARLAN, at a meeting of the Illinois State Dental Society, expressed his opinion that there was but little hope in pulp capping in adult life if the tooth had ached for some time with pus exuding when opened; but every effort should be made to maintain its vitality up to twenty-five years of age.

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THE Illinois State Dental Society believes that the time spent in college or in the study of dentistry (two years) is too short for proper preparation for entrance upon the practice of dentistry, therefore it resolved: "That the National Association of Dental Faculties be requested at their forthcoming meeting in Louisville to adopt as a requirement for graduation that the student shall have studied three full years, including attendance on two full courses of college instruction in separate years."

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PROFESSOR SIR WILLIAM TURNER, F.R.S., in a communication to the Royal Society, on the placentation of the temurs, considers



that the temurs are, in their placental characters, as far removed from man and apes as it is possible for them to be. He is of opinion that they ought to be grouped apart from the apes in a special order of their own.

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PROFESSOR G. AITCHISON, A.R.A., in the Cantor Lectures before the Society of Arts said: "Almost all our best patterns have come from the East, and I know that the designer is highly paid, and gets a heavy royalty on every piece that is woven or embroidered from his design."

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IN an adult specimen of a rare sea snake (*Hydrophis viperina*) there is a new type of dentition, which has been observed by G. A. Boulenger. In *Hydrophides* the maxillary bone is armed with one grooved poison fang, behind which is a series of smaller teeth. In *Hydrophis viperina* there is, instead, a series of four equidistant sub-equal grooved fangs connected with a large poison gland. *Ogmodon vitianus* was the only snake known to possess a series of grooved fangs.

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MONTHLY STATEMENT of operations performed at the two Dental Hospitals, in London, and at the Manchester Dental Hospital, from May 1st to May 31st, 1888:—

May 1st to May 31st, 1888 :—					London.	National.	Victoria.
Number of Patients attended ... ..					2933	4036	775
Extractions	{	Children under 14	...	...	529	412	556
		Adults	...	...	1084	487	
		Under Nitrous Oxide	...	...	809	933	48
Gold Stoppings	...	...	...	526	185	77	
Other Stoppings...	...	...	...	1217	892	107	
Advice and Scaling	...	...	...	117	669	—	
Irregularities of the Teeth	...	...	...	135	280	—	
Miscellaneous and Dressings	...	...	...	397	266	200	
Total ... ..					4,814	2,124	988

# THE DENTAL RECORD.

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## SOME AFFECTIONS OF THE GUMS.

*(Being a paper read before the Students' Society of the National Dental Hospital,  
Great Portland Street, W.)*

By FRANK LANKESTER, L.R.C.P., M.R.C.S., L.D.S.Eng.,  
House Surgeon to the Hospital.

I SHALL endeavour, so far as time will permit, to bring before your notice some of the chief and more important affections of the gums, including those that usually come under the care of the general practitioner, and I shall hope to show how very important it is that we, as dentists, should be thoroughly well acquainted with them.

We of all men should know what is the normal healthy appearance of the gums, and should therefore also at once notice any abnormal condition that they may present. In examining a patient's mouth for caries, or any other diseased condition, we do well to cultivate a habit of thoroughness; we should not be satisfied with merely looking at the teeth, but should be careful also to inspect the gums, for we may often learn much about the condition of a tooth or root by simply observing the state of the surrounding parts. Then, if anything abnormal be present, we should endeavour to find out the cause of it and, if possible, a remedy for the same.

I thought the following was, perhaps, the best *classification* of the different affections, and I must thank my friend Mr. H. Arthur Sansom for some help in this matter, to whose kindness we are also indebted for the loan of the various diagrams I shall send round.

We may broadly divide the affections into two classes: the LOCAL and the CONSTITUTIONAL.

The *Local*, consisting of those which originate in the gums themselves, include the following:—

1. Simple inflammations from injury, &c.
2. Parulis, gumboil or alveolar abscess.

3. Simple epulis, or fibroma.
4. Polypus of gum, or simple hypertrophy.
5. Papillary and warty growths.
6. Vascular tumours, or nævoid growths.
7. General hypertrophy.
8. Pyorrhœa alveolaris (so-called Riggs' disease); and
9. Primary epithelioma, or cancer (carcinoma).

The second class, the *Constitutional*, consist of those which occur in the course of a general systemic disorder, and include—

1. Syphilis.
2. Scrofula.
3. Scurvy.
4. Purpura hæmorrhagica.
5. Addison's disease.
6. Stomatitis, of which there are three forms: simple; ulcerative; gangrenous (noma).
7. Aphthæ, or thrush.
8. Herpes; and
9. Lastly, the metallic poisons: lead, silver, mercury and copper.

We should certainly be able to form a correct diagnosis of any case we may meet with, though to do this often requires considerable practical experience as well as mere book knowledge. Many of these affections we, as dentists, are often called upon to treat, and there are others which, having diagnosed, we should hand over to the care of the general practitioner. These latter, which are generally the more serious cases, we may from time to time, perhaps quite accidentally, meet with, and we should be just as well acquainted with them as we are with the simpler affections. This, too, should be the more insisted on, as we are more likely to see them in their earlier stages, and by a proper and immediate appreciation of the diseased condition we may be able to warn our patient, and thus induce him to obtain prophylactic treatment, and thereby perhaps save him from a long and serious, nay even fatal, illness.

Before we now proceed to discuss some of these affections, it would perhaps be well for me to first very briefly remind you of the chief points in the *structure* of the gums. They are mainly composed of a dense fibrous connective tissue, cohering very closely with the alveolar and dental periosteum, whilst on their surface they are covered with a very vascular mucous membrane: this is mostly

smooth, but, in the neighbourhood of the necks of the teeth, it is beset with very fine papillæ.

With these opening remarks, I will now try to place before you as briefly as possible a few observations on most of the various affections which have been enumerated, and we will first consider the *local* ones, commencing with—

*Parulis or Gumboil.*—The external manifestation on the gum of alveolar abscess. This affection consists of an inflammation usually running on to suppuration, occurring about the apex of the root of a tooth. The apex itself becomes enclosed in the abscess sac, the latter being adherent to the root at a little distance from the apex. The dental periosteum is included in the sac walls. The tooth pulp is nearly always dead, and it is the decomposition of the dead pulp that generally gives rise to the abscess. The dental periosteum first becomes inflamed at the apex, suppuration soon takes place, and the pus that forms strips off the membrane from the root, and an alveolar abscess is the result. When there is no exit for the pus through the pulp canal, it finds an exit for itself by “pointing” externally, and generally on the gums, as the so-called gumboil. In rare cases simple periostitis from cold, &c., may go on to suppuration, and so be the cause of parulis. The pus soon finds its way through the alveolar plate, and appears beneath the gum immediately (as a rule) over the diseased root as a small, red, tense, very tender swelling. There is always a good deal of pain, it being generally worse at night when the recumbent posture is assumed. Pain is of a throbbing character. There is always a certain amount of otitis and periostitis around the seat of inflammation, so that gentle percussion on the adjacent teeth will cause pain, though of not nearly so severe a degree as will be that caused by similarly percussing the tooth actually connected with the abscess. This difference in tenderness will help us to decide which is the offending tooth. If left alone, the pus will come to the surface and discharge itself, leaving behind it a sinus which frequently remains open for months.

At the orifice of the sinus, little sprouting granulations often appear, indicating the site of a former gumboil which has discharged itself in this way.

As regards treatment, I cannot do more than just mention that in the early stages before suppuration has taken place complete relief may often be afforded by painting the inflamed area two or three times with the liniment of iodine, but before doing this it is very important



to first thoroughly dry the gums previous to applying the iodine, as otherwise the latter simply floats as it were on the moist mucous membrane without affecting it very materially. A good saline purge should also be administered. This will often be found very useful in the case of a recently stopped tooth which appears to be "going wrong," but which you do not wish to interfere with if you can possibly avoid so doing. The tincture of iodine is much too weak a preparation to be of much good. We must not forget the possible results of alveolar abscess if neglected or improperly treated. External poulticing (the usual resort) will frequently cause it to point on the cheek externally. I had a case only two weeks ago in which there had been a fistulous opening in the cheek for months, and a probe passed right through into the mouth; I removed a root and the sinus healed up immediately. When suppuration, therefore, has set in, relief can and should at once be given by evacuating the pus, either by a small lancet or by the extraction of the offending root.

*Superficial Gumboil.*—Salter mentions that there is another form of parulis occasionally met with which is associated with loose teeth, absorbed sockets, and tumid gums. The pus is situated in the substance of the latter, but quite superficial to the alveolar processes.

The next affection we have to consider is *Epulis*. This term has been vaguely applied to various tumours in and upon the gums (a fact to be explained by the etymological meaning of the word, *epi*, *ou'a*, upon the gums). But by the simple or true epulis we mean those dense fibrous tumours that arise upon the surface of the alveolus and involve the periosteum, and by their growth cause the overlying gum to become stretched over them, the gum being otherwise healthy. They differ in origin, history and structure from those pendulous masses so often found around decayed teeth and known as polypus. There is no connection between epulis and caries as is the case with polypus and caries. A true epulis, then, is a hard dense mass of fibrous tissue, starting from the alveolar margin, usually between two teeth and more generally on the labial than on the lingual aspect. It is usually seen upon that part of the gum projecting up between the necks of two teeth, one or more of the latter being usually displaced by its growth, which is slow and regular. It increases more in its basal area than in its vertical diameter, starting from the porous and vascular alveolus and being closely connected with the periosteum usually by a narrow pedicle. The gum over it is usually healthy, but it may be mottled and slightly lobulated. The tumour

itself is tense and elastic to the touch, insensitive and of low vascularity. Its size varies from that of a pea to that of a walnut and it is about twice as often met with in the upper as it is in the lower jaw. It occurs usually in connection with some one particular tooth, the removal of which, together with the excision of the tumour, nearly always results in a complete and immediate cure. It is very rarely seen in an edentulous jaw, and then it will generally be found to be connected with some hidden stump. Salter relates a good case in illustration of this, in which a tumour repeatedly recurred after excision until the real cause was discovered. The epulis extended from the canine to the wisdom tooth, the four intermediate teeth having been removed. It was excised again and again, but always recurred until on one occasion a first molar stump was discovered and extracted, after which there was no further recurrence. The alveolar periosteum, the endosteum and the fibrous tissue of the gum are all continuous, and all share alike in the development of this growth. They are perfectly innocent and painless tumours, but they may take on a malignant character.

As to the treatment. In an ordinary case it will be well to first try the effects of simple removal by excision with a scalpel, together with a small portion of the spongy bone at the base of the growth. If it returns, as is frequently the case, repeat the operation together with the extraction of one or more of the implicated teeth. The alveolus will thereby become absorbed and will no longer form a nidus for the recurrence of the tumour. When arising deeply from the socket of a tooth, it may then be necessary to cut away a V-shaped portion of the alveolus, together with a very small piece of the subjacent bone. This can easily be done with a Hey's saw and a pair of bone nippers. Any hæmorrhage can easily be checked by the actual cautery. If the growth be unrestrained by treatment, it will continue to enlarge and interfere with articulation and mastication, and thereby causes much inconvenience. The surface but rarely ulcerates, but it may be injured by opposing teeth; and ulceration thus excited may give rise to a copious and fœtid discharge. Sometimes sarcomatous cells are mixed up with the fibrous tissue, and we may then expect it to recur after removal.

*Polypos* or *Simple Hypertrophy* of the gum comes next on our list. This is purely a local affection of the gums alone, quite apart from the periosteum. It is generally associated with uncleanly habits, the presence of tartar or some other form of irritation, and is

usually most marked along the borders or margin of the gums, and especially the interdental portions. It consists in a simple hypertrophy of the gum tissues, and is brought about by some long-continued irritation. The gums may be so increased in size as to nearly cover the crowns of the teeth, and it is most commonly met with, and most pronounced, in the front part of the mouth. These two models I now send round are very good examples of this affection. They were lately presented to our society by Mr. Jones. The treatment as a rule is very simple, and consists in scarifying the gums and getting rid of the irritating cause, *i.e.*, by thoroughly cleansing the teeth, removing all tartar, and washing the mouth occasionally during the day with a strong solution of tannin or other harmless astringent, to which may be added a very small quantity of Condy's fluid. The gums will then, usually, soon recede to their normal size and condition. I saw a case, yesterday, which Mr. Humby treated for a long time before curing his patient. This was caused in first instance by wearing a regulation plate. The hypertrophy was so extensive and rapid that the wearing of the plate had to be discontinued.

A more truly polypoid form of this same affection of the gum may be very frequently seen in connection with almost any large cervical cavity. It occurs as a small pedunculated mass, resembling the gum tissue, and more or less fills up the cavity. It is due to the constant irritation caused by the rough edge of the cavity coming into contact with the gums. The irritation leads to a slight chronic inflammation and consequent overgrowth of the existing gum tissues (*i.e.*, hypertrophy), in which the true mucous membrane elements take part. The tumour is usually tender and at times painful. The treatment, if any be required, consists in removing the cause, either by filling the cavity or getting rid of the tooth or root with its projecting sharp edge. When nothing more than simple excision of the growth is performed, it almost always returns. This is well illustrated in a case which Salter relates, in which the hypertrophied mass was about half as large as a chestnut, and much resembled ordinary gum in appearance. At first sight it might very easily have been mistaken for an epulis. It arose from the portion of gum situated between the three separated roots of an upper first molar and was attached by a short pedicle. It was first excised, the stumps were then removed, and there was, of course, no recurrence.

*Papillary Growths* come next on our list. These may occur on



the gums, but are exceedingly rare. They consist simply of hypertrophied papillæ, and are really unimportant. Caustics sometimes arrest or cure the growths, but a free excision is usually the best treatment, though even after this they sometimes tend to recur.

*Warty Growths* are also very rarely met with on the gums, but they do occur, and much resemble the ordinary cauliflower excrescences so frequently seen on the hands, &c. They are quite innocent, but there is often very considerable difficulty experienced in getting rid of them, just as is the case when they occur on the hands. At the same time, there is the liability for them to take on a malignant character. They are of a pale whitish colour, and contrast very strongly with the surrounding red gum. The microscope-specimen I now pass round shows their structure. It is really a papilloma of the neck.

*Vascular Growths.*—Another very uncommon affection is a naevoid or vascular tumour of the gum. Such usually occur in adult or middle life, and are most commonly situated in the upper jaw, between the incisors and canines. They are generally of small size, about as large as a pea, and are often more or less pedunculated. They tend to increase in size; they are compressible, and can thus be reduced to the level and colour of the gums. They are of a bright red colour, and bleed readily on pressure, &c. Hæmorrhage is indeed their most important symptom; it usually occurs at night, when in the recumbent posture, and consists in a general oozing from the whole surface of the growth. In rare cases this may be very severe, and on this account they may require removal, though they are perfectly innocent, and do not return when carefully eradicated. This is best done by freely excising with the knife, including, at the same time, a small portion of the subjacent vascular and spongy bone. Cold and pressure will usually check any hæmorrhage. Any subsequent sprouting granulations should be touched with nitrate of silver. Before resorting to excision, you might first try the effects of ligaturing the growth, or of destroying it by caustics.

The condition known as *General or Congenital Hypertrophy* of the gums and alveolus is exceedingly rare. It occurs chiefly in children, and with it is frequently associated some other tegmentary hypertrophy, such as a thick skin, coarse hair and nails, &c. The whole or the greater part of the gums and alveolar processes are involved in a general hypertrophy. The greatly enlarged alveolar processes are covered by the much thickened gums; the latter being pale, inelastic,



firm and insensitive. The growth may increase to such an extent as to prevent the perfect closure of the lips. The teeth are often quite hidden; especially is this so in the front of the mouth, where the condition is always more marked. Both jaws are usually affected. The thickening of the gums is due to an immense increase of the fibrous tissue, together with an enormous enlargement of the papillæ of the mucous membrane. The teeth, too, are of an immense size comparatively. The progress of the disease is slow and unaccompanied by pain, nor is there any tendency to ulceration. The treatment consists in paring off the lobular masses of the gum, and then in excising the hypertrophied alveolus with a pair of bone nippers. The whole of the growth need not be removed in one operation. There is but slight tendency for it to recur. This treatment involves, of course, the loss of the teeth, but they are worse than useless so long as the hypertrophy exists. I am indebted to Mr. Weiss for these models of this affection.

We will now pass on to consider an obscure, though somewhat important affection, known as Riggs' disease, or a better and more correct name is *Pyorrhæa alveolaris*. It is not so very uncommon, and consists in a rapid and premature loss of the alveolar processes, together with a certain amount of inflammatory disturbance. One of the first indications of the advent of this disease is seen in a thickening and rounding of the margins of the gums on both sides of the mouth, and they cease to be closely adherent to the necks of the teeth. Between the gums and cementum for a short distance there is generally a little pus to be found. The breath is foetid or nauseating, and there is a considerable amount of offensive discharge.

Neuralgic pain is often present, as also a chronic inflammation of the gums. It sometimes follows scurvy and mercurialism. The causes and pathology of the disease are very obscure, but there are a good many reasons that point to its being a part of a constitutional disease. Treatment is very far from successful in curing this affection, and it rarely does more than temporarily retard the progress of the disease. It consists in first of all removing very carefully and thoroughly all tartar from the necks of the teeth and from within the margin of the gums, and as the seat of the disease is probably at the edges of the alveolar processes, it is sometimes very beneficial to scrape these processes; it, however, gives considerable pain. Some strongly advocate the use of caustics, &c., to be applied to the edges of the gums, and to be rubbed well up towards the necks of the

teeth within the gum margins. The following are those most in vogue—Powdered sulphate of copper, iodoform, aromatic sulphuric acid, chloride and iodide of zinc. As the disease progresses, the alveolus becomes more and more absorbed, the teeth get loose and finally fall out.

We now pass on to about the last, though by no means the least important, of the local affections of the gums; in fact, so far as the patient is concerned, it is by far the most important of them all, and such is the point of view in which it should also be regarded by the dental practitioner, though it may not come under his notice nearly so often as some of the other affections. He may perhaps never meet with a case in his own practice, and yet I hold that he should be thoroughly well able to diagnose it should a case come under his notice or care. I refer, as you know, to *epithelioma* or *cancer*, and sometimes *wrongly* called *malignant epulis*. This latter term should only be applied to those myeloid sarcomatous tumours of the jaw that Mr. Heath has described. I have not time to say anything more about this latter affection, and it hardly comes within our category to-night, but there is a very typical specimen of one under the microscope in which you can well see the large myeloid or giant cells scattered about amongst the smaller spindle-shaped sarcomatous cells. Towards the surface are a few fragments of the expanded bone which appear of a yellowish colour; you will observe a great difference between this specimen and the fibroma, which you have already seen.

After this slight digression we will return to the consideration of *Epithelioma* originating in the gums. It is generally due to some long-continued irritation such as that excited by the wearing of an ill-fitting artificial denture, or the presence of unhealthy roots, to which may often be added a strong hereditary predisposition to cancer. I don't think we should lose sight of this fact when dealing with artificial work. Any ulceration of the gums or mucous membrane of the mouth occurring in an elderly patient, and which does not readily yield to treatment, but rather tends to grow worse, should be looked upon with very grave suspicion as to its nature. These cases are generally first seen by a dentist, and often at a comparatively early stage of the disease, at a time when it may be a matter of life and death to the patient that the disease be recognised at once and properly treated. I fear that if such a case at an early stage of the disease were presented to the average dentist of to-day it

would in but too many instances merely receive palliative and expectant treatment; meanwhile the disease would go on steadily but surely progressing, valuable time would be lost, and when at last the dentist hands it over to the care of the surgeon, all hope of a radical cure may be gone for ever, or at least be much more doubtful. Hence the great importance of the dental practitioner being thoroughly well acquainted with the disease, its diagnosis, and serious prognosis. It generally occurs in persons over forty years of age, and usually in the form of a warty or papillated growth, which ere long tends to ulcerate and break down in the centre of its free surface, whilst it continues to spread circumferentially, by invading the surrounding tissues. There is great induration of these tissues all round the growth. The central ulcerating portion soon becomes deeply excavated, the edges become raised and everted, ragged and irregular, and considerably undermined. The surface is sometimes very vascular, and bleeds readily on the gentlest touch. It has a dirty, unhealthy appearance, is of a greyish colour, and there oozes from it a little thin sanious discharge. The growth soon involves the adjacent tissues, such as the cheek, tongue, &c., the teeth in the affected area become loose and fall out, and it is not very long before the submaxillary lymphatic glands in the neck become secondarily affected. There is generally more or less pain, and sometimes it is very severe. The lower jaw is more frequently affected than the upper. Mr. Christopher Heath says that nothing but very free and early removal offers the patient a chance of permanent relief, and that it is much better to remove a piece of the whole thickness of the jaw well beyond the seat of the disease rather than merely the alveolar margins, since you can never tell how deeply the bone may be involved. This leads necessarily to permanent disfigurement, but by doing less you are running a very serious risk of its recurrence. It is, of course, a case for a surgeon to treat, but it is occasionally the dentist's duty to diagnose and hand over such a case to the surgeon. I do not wish to detain you too long over this affection, but as I cannot here show you a case, I must, with your permission, content myself with giving you, as briefly as possible, the account of a case that lately came under my notice at this hospital. (*See DENTAL RECORD*, page 193, May, 1888.)

*(To be concluded.)*

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**REVIEWS OF BOOKS.**

**AIDS TO DENTAL SURGERY.** By Arthur S. Underwood, M.R.C.S., L.D.S.Eng., &c. London : Baillière, Tindall & Co.

THIS work is one of the "Students' Aids Series," and therefore intended for students preparing for dental examinations. Works of this kind should avoid the possibility of aiding and abetting the lazy student. It may be said that the author has, in this instance, been more a benefactor to the drone than the brevity of a "Note Book" or an "Aid" should be.

The book consists of an abbreviation of the several subjects as treated in the larger text books, with, in addition, a goodly amount of the author's experience, personal opinion and methods of treatment, which are not to be found in any text book. This is in keeping with what is announced in the Preface :—"I have endeavoured to condense into a concise form that department of the science of dental surgery which is capable of such treatment." How far condensation as here effected, or a still more brief epitome, without discussion and comments, will better "aid" the student and at the same time avoid the evil already mentioned, are questions which should be duly considered in producing works of this nature.

In the eight chapters, of which the book consists, the author has succeeded in presenting a very readable abridgment ; and there can be no doubt that Mr. Underwood will thereby smooth the path of many "of the large body of dental students with whose education and welfare my daily work has been and is so largely concerned."

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**THE STUDENT'S MANUAL AND HAND BOOK FOR THE DENTAL LABORATORY.** By L. P. Haskell. Philadelphia : The Welch Dental Co.

THIS is a small book of 79 pages, embodying "the result of forty years' experience in the dental laboratory and exclusive attention to prosthetic dentistry. It is not intended to take the place of the text book in the dental college, though the student will find it there a valuable aid in the production of his preparatory work."

In thus providing an outline of the major operations in dental mechanics, the author gives more attention to metal work than to rubber plates. Babbitt metal is considered the only alloy that furnishes all the qualities requisite for a dental die. And "it is sometimes necessary to make a second die, but not generally, when Babbitt is used." With regard to bands, it is stated "clasps should not be so wide as to cover a large portion of the tooth, being



cumbersome and looking badly. Neither should they be so very narrow, as is the custom with English dentists, as they wear into the enamel." The author has formed a wrong idea of what is the "custom" of the "motley crew" who have hitherto practised dentistry in the United Kingdom; but they are not representative of our calling.

At page 30 it is stated that "coin silver should never be used, as it *oxidises* badly in the mouth." Is it not sulphur which corrodes and blackens silver in the mouth?

There is not any mention made of dental alloy, nor of tube teeth, the use of which would appear to be limited to this side of the Atlantic.

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DENTAL METALLURGY. By Chas. J. Essig, M.D., D.D.S. Second edition. Philadelphia: The S. S. White Dental Manufacturing Co.

THE first edition of this work was published six years ago and noticed in the pages of the DENTAL RECORD. This second edition is a revise and enlargement of the former issue, into which "the more recent improvements in the reduction of metals and the formation of alloys and amalgams used in dentistry have been incorporated."

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### PHOSPHOROUS NECROSIS OF THE JAWS.

IN a paper contributed to the *Transactions of the American Surgical Association*, Vol. iii., 1885, by J. EWING MEARS, M.D., Professor of Anatomy and Clinical Surgery in the Pennsylvania College of Dental Surgery, the following propositions are submitted with regard to phosphorous necrosis of the jaws:—

That the disease is a local expression of the constitutional condition produced by the inhalation of the vapour of phosphorous, and by particles of the agent taken into the system with the food, by operatives in match factories who do not give proper attention to cleanliness of the hands.

That the introduction of the agent into the system is, as a rule, very gradual, and in such small quantities as to avoid the production of symptoms of acute poisoning; that, in this way, the chronic toxic condition of the system is induced, characterised chiefly by disintegration of the red blood corpuscles and fatty degeneration of the arterial coats.

That the toxic condition precedes the jaw disease, as is shown by the fact that the disease does not attack operatives recently exposed to the action of the agent, but those who have been exposed for a period of years.

That examination of the teeth of operatives has shown that many who have caries, and have returned to work immediately after

extraction of teeth, have enjoyed immunity from the disease, showing that the agent had not attacked the periosteal tissue thus exposed. This was further shown by the fact that, in one of the cases, necrosis did not appear until three months after labour in the factory had ceased.

That individuals vary in their susceptibility to the action of the poison ; for this reason many suffer immediately with acute symptoms, such as nausea, vomiting, &c., and are compelled to abandon work in the factories.

That the conditions under which experiments have been made on animals, to prove the absence of the disease until exposure of the periosteum and peri-alveolar tissue was affected, are not similar to those to which operatives in match factories are subjected.

That treatment of the disease in the primary stage is efficient and prevents its progress.

That the antidotal powers of turpentine have been established.

That the disease is to be prevented among operatives by the adoption of thorough methods of ventilation, stringent rules with regard to cleanliness, and the free disengagement of the vapour of turpentine in all the apartments of factories in which the fumes of phosphorous escape.

## ON THE NATURE AND LIMITS OF REPTILIAN CHARACTER IN MAMMALIAN TEETH.

By H. G. SEELEY, F.R.S., Professor of Geography in King's College,  
London.

(From "*Proceedings of Royal Society.*")

APPROXIMATIONS between reptiles and mammals have been recognised in many parts of the skeleton.\* They are most marked between certain genera and orders of the two classes. The oldest known fossil representatives of both groups certainly approximate closer towards each other in all known parts of skeletons than do the orders which survive; so it may be a legitimate induction that, in an earlier period of geological time, the characters of both groups were so blended that there existed neither the modern reptile, which has specialised by losing mammalian attributes, nor the modern mammal, which has specialised by losing the skeletal characters which have come to be regarded as reptilian. The most ancient mammals exhibit, in the known parts of their skeletons, resemblances to Monotremes, Edentates, Insectivores, and apparently Carnivores ;

\* "Resemblances between the Bones of typical living Reptiles and the Bones of other Animals;" "Similitudes of the Bones, &c.," 'Journal of the Linnean Society, Zoology,' vol. 12, 1874, pp. 155, 296.

and it is among these orders that the closest correspondence is found, bone for bone, with reptiles. Therefore, if an attempt were made to predict on an inductive basis, the kind of dentition which the earliest mammals which existed would show, it might be expected to be in harmony with the mammalian and reptilian characters of their skeletons. On the same basis it might be suspected that existing mammals, with reptilian elements in the skeleton, would still preserve teeth which might be compared with teeth of reptiles; and as a matter of observation it is found that there are several features in which teeth of reptiles and mammals resemble each other morphologically.

The idea conveyed by the expression "mammalian tooth" is necessarily that specialisation of tooth structure which is limited to the mammalian class. It may be unknown in the dental conditions of entire families and orders of mammals. And there is an absence of pronounced character in the incisor or canine teeth of any mammal order which would distinguish them as mammalian.

Similarly the idea implied in the term "reptilian tooth" is the specialisation of teeth in the reptilian class, which is as far from being universal in the class as mammalian teeth are universal among mammals. Indeed, the lower mammals emphatically approach towards reptiles in all essential characters of tooth form.

Because the diversities in the teeth of the two classes have been emphasized for purposes of classification, the significance of the resemblances has been less considered.

There are six typical characters of teeth which are regarded as mammalian. They are :—

- (1.) The presence of more than one root to a tooth;
- (2.) The implantation of teeth by distinct sockets;
- (3.) The existence of different kinds of teeth in the same jaw;
- (4.) The development of distinct cusps to the teeth;
- (5.) The wear of the crown with use;
- (6.) Replacement by a successional series;

No one of these characters can be relied on as constant in the class; and its loss is in every case an approach towards a reptilian type.

First, the root is not the original or essential part of the tooth. While the successional teeth are within the jaw they commonly have the roots undeveloped, and thus up to a certain stage of growth are without this evidence of character. There is never more than one root to an incisor or canine tooth in any mammal; and never more than one root to any tooth (so far as I can ascertain) in an existing

Edentate or Cetecean. Hence, if all mammals are supposed to have had a common origin, it is legitimate to conclude that all the teeth originally possessed but one root; and that there is a certain relation subsequently established between the complexity of the crown and the number of the roots.

The situation of a root would imply that its development is due to the same law of growth under intermittent pressure or strain as determines the form or elongation of any other bone.\* If more than one root is present they are commonly beneath the several parts of a tooth which have to resist intermittent strain or pressure. If the pressure is great and the wear considerable the crown of the tooth grows in length, while the roots are relatively small; but if the intermittent strain on the tooth is great then the crown is relatively short and the roots long. The latter condition is well seen in the molars of Carnivora; the former in the molars of rodents and ungulates. The small roots of ungulates and rodents illustrate a mode of development of roots: for I have seen teeth of an aged fossil horse from the gravel in which the crown was completely worn down, and then the roots appeared to be relatively almost as well developed as in *Rhinoceros*.† Perhaps no order is more instructive in regard to the classificational value of roots of teeth than the Sirenia, because *Manatus* has tuberculate teeth and well-developed roots to the molars, while *Halichore* has but one strong root to these teeth, indistinguishable from the crown, with a hollow conical base, such as is often seen in reptiles. From these considerations I infer that the type of tooth—at least as regards complexity—is to be correlated with the influences exercised by food, and is not a distinctive inheritance.

Secondly, the implantation of teeth in bony sockets is a mammalian character which is not less well marked in the Crocodilia and some extinct orders of Reptiles. The implantation in mammals with single roots to the molars differs in no way from the conditions which I have observed in Theriodont Reptilia. There are some exceptions among mammals to the location of teeth in sockets, since in certain Cetacea the teeth are in a groove at the posterior end of the series. And the Ornithorhynchus may be regarded as another exception, since it has three teeth on each side closely united together into one long ovate mass which is contained in a groove. The

\* "The Mechanism of Growth," 'Ann. Mag. Nat. Hist.,' April, 1872.

† The specimen was obtained by the Rev. N. Brady from near Cambridge.



teeth are closer together than those of *Ichthyosaurus*, and there is no more definition of the groove into separate sockets than in that genus; but there is nothing else in common, since the base of the dental plate of *Ornithorhynchus* can scarcely be said to have roots. Frederick Cuvier described these teeth as horny,\* and many writers have been disposed to regard them as horny plates rather than true teeth. Sir R. Owen quotes a French analysis of the tooth substance as yielding 99·5 horny matter and 0·3 calcareous matter.† This may be true of the long anterior horny plates on the jaws, but it can hardly apply to the posterior teeth, which are in a socket-groove. If the dental plate is extracted from the jaw and examined against transmitted light, each of the three teeth which form it will be seen to consist of a large opaque subquadrate central portion, and an external translucent border of a horny appearance. I regard the latter as representing the uncalcified enamel of the tooth, while the central portion corresponds to the remainder of the tooth. I have had an opportunity, by the kindness of Dr. Garson, of examining the microscopic section of these teeth prepared by the late Professor Quekett, and preserved in the Museum of the Royal College of Surgeons, and they confirm my previous impression that the central portion of the tooth is bony (at least in some specimens), and in microscopic structure it shows large haversian canals surrounded by spaces and canaliculi. I therefore regard these teeth of *Ornithorhynchus* as true teeth. But they seem to me to be teeth in course of degeneration, and in process of losing their calcareous matter. They have already lost their root or roots, and have partially lost their individuality. The long anterior dental ridges appear to have carried this change one step further and have become dental layers formed of vertical parallel plates of horn in which there is no division into separate teeth, which are not imbedded in the jaw, but are a horny superficial substance. It is not without interest to remark that some other animals which have lost their teeth, like birds, and presumably Chelonians, which use the jaws for biting, also have them sheathed in horn; for the condition in *Ornithorhynchus* suggests that the horny substance may represent the lost substance of teeth.

Thirdly, mammalian teeth are commonly distinguishable into different kinds, which when fully developed vary in the forms of

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\* "Des Dents des Mammifères," 1825, p. 203.

† "Odontography," p. 311.

their crowns, and are thus recognised as incisors, canines, premolars, and molars. This differentiation is almost entirely absent from the dentition of Cetacea and Edentata; and it is well known that in different orders canine teeth, or incisor teeth, or both, may be absent. These conditions can be frequently correlated with food. But just as the grouping of teeth in the mammals may approach in simplicity the conditions in reptiles, so the teeth of some reptiles in different parts of the jaws may parallel the divisions found in the jaws of mammals which show considerable differentiation.

The fourth mammalian character is the cuspidate condition of the crown of the tooth. This results from a folding of the substance out of which the tooth is formed, and among the molar teeth of many mammals shows a specialisation which is unparalleled among reptiles. But, on the other hand, the complexity of some hinder-molars becomes simplified in the premolar region, and among Edentates and Cetaceans the tooth crowns are simpler than among some reptiles. In several orders of mammals it is obvious that the direction in which the folds of tooth substance are disposed is at right angles to the direction of movement of the lower jaw; and therefore it may be a fair inference that the transverse widening of molar teeth, no less than their diverse cuspidate character, is to be attributed to the increased work which food has given them to do in the molar region; and that development or suppression of a cusp in allied genera of mammals depends upon this cause. With simplicity of function there is simplicity of detail in the crown of the tooth. Some of the simplest teeth are found among the Edentata, where the tooth is often sub-cylindrical, but as the crown is worn down, its original form is not seen. *Tatusia*, however, is an Edentate with successional teeth, and while the crown is still within the jaw it has a form which is as reptilian in aspect as the molar tooth of a *Teius*. The crown of the tooth of Cachalot is a short curved cone. Hence it is manifest that the molar teeth of mammals are not necessarily cuspidate, and that in simplicity of crown there may be no character to distinguish a mammal from a reptile. From which it is probable that some primitive fossil mammals may also have a reptilian type of dentition. The recent discovery of a set of teeth in the jaws of *Ornithorhynchus*, hitherto unknown, raises the question whether those teeth are mammalian. Mr. Poulton has only contributed a vertical transverse section of one

of these teeth,\* which shows elevated external and internal cusps. I have no other knowledge of those teeth, but the condition figured is suggestively similar to a corresponding section of a molar tooth of the lizard genus *Tecius*.† Professor Mivart quotes‡ from Mr. Poulton a passage, which I do not find in that gentleman's paper, describing the tooth, and from that description it would appear to correspond generally with the tooth of the adult *Ornithorhynchus*. I have already considered some characters of those teeth, and allowing for their degeneration, they seem to me to approach as close perhaps to the form of crown in lizards like *Tecius* as to any of the larger bats.

Fifthly, mammalian teeth are often remarkable for the wear of the crown. This attrition appears to depend upon the form of the crown, the apposition of crowns, the development of enamel, and the nature of food. It is exceptionally well seen among Elephants, Ungulates, and Edentates; but almost all mammalian teeth show some change of aspect with wear. This condition is much less general among reptiles; but in the extinct *Ornithischia* the serrated crowns of the teeth are as well worn as in any mammal. The long teeth of *Hyperodapedon*§ appear to be well worn down to the palate. Exceptionally teeth of *Ichthyosaurus* and *Polyptychodon* show both vertical wear and lateral wear, and there are specimens in the Woodwardian Museum from the Cambridge Greensand in which teeth of these genera have the crown worn away transversely almost down to the root; so that neither wear nor its absence has any importance as a class character, but this condition of teeth varies in every order with the habitual food.

Finally, the succession of the teeth has been regarded as a mammalian class character. It is exceptional, and an individual peculiarity, for more than two sets of teeth to be cut in a mammal, though evidence has been brought forward that this reptilian condition is occasionally present in man. But even in those mammals which cut a second set of teeth there are commonly some molars which have no predecessors, and are a single series throughout life. So far as known, most Edentata and Cetacea have but one set of teeth,

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\* "Roy. Soc. Proc.," vol. 43, p. 355.

† Sir R. Owen compares the teeth of *Ornithorhynchus* to those of the reptilian fossil *Placodus* ("Geol. Soc. Quart. Journ.," vol. 36, p. 423), but the details of structure of the crown are not the same.

‡ "Roy. Soc. Proc.," vol. 43, p. 373

§ Lydekker, "India Geol. Surv. Mem.," ser. iv. vol. 1, part 5, pl. 2.

which is never renewed ; and, according to Professor Flower, *Tatusia* is the only Edentate in which successional teeth are known to be developed. I have seen no evidence of a successional tooth in any Dicyodont reptile. Sir R. Owen has found no evidence that the Theriodontia possessed "a milk series of teeth."\* When a successional tooth is present in mammals it usually originates below the tooth in wear, or behind it, as in the elephant. This condition is seen in some reptiles as in the *Ornithischia*. But the typical condition of reptilian succession is for the germ of the new tooth to be on the inner side of the tooth in wear. This is the condition in Ichthyosaurs and most of the extinct Reptilia, and is often, though not invariably, seen in Crocodiles. It is, therefore, interesting that Mr. Poulton describes the new-found teeth in *Ornithorhynchus* as possibly on the inner side of the so-called horny plates, though in the lower jaw they are certainly below those plates. Hence, if those germs are successional teeth, their relative position would not be inconsistent with reptilian or mammalian type.

From this discussion I conclude that in all morphological relations the teeth of mammals may be so simplified as to approach closely to conditions which would be regarded as typically reptilian.

I have next to show that the prevalent conception of the reptilian type of tooth is equally indefinite. The differentiation is less striking than among mammals, but in almost all morphological characters reptiles suggestively approach mammals, though these characters seem to me most remarkable in the grouping of the teeth into analogues of molars, premolars, canines and incisors, and in the characters of the crown in molar and other teeth. It is rather among the oldest extinct reptilia that we should expect to find the nearest approach to mammalian dentition, and so it is ; but evidences of a similar differentiation may be detected among Crocodiles and Lizards.

The form of the crown varies very little from front to back among Crocodiles, though some teeth are relatively large, and the smaller posterior teeth are a little compressed transversely ; but when the teeth are drawn from the jaw the alveoli show modifications which might be regarded as mammalian. This character has been figured from the lower jaw, and in 1878 it was remarked : † "Among Crocodiles I recognise in the well-known wavy outline of the jaws a demarcation

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\* "Geol. Soc., Quart. Journ.," vol. 37, p. 261.

† On Procolophon," "Geol. Soc. Quart. Journ.," vol. 34, 1878, pp. 804—5.



of teeth into regions which have a fair right to be named incisors, canines, premolars and molars, and constitute a dentition as theriodont in principle, but not so specialised, as is seen in the South African fossil group. In the Crocodile the regions are easily recognised by the form, size and characters of the tooth sockets when all the teeth are drawn, especially in the lower jaw. The incisors occupy a flat or slightly concave region below the premaxillary bone. Then at the head of the crest is the large canine placed between the premaxillary and maxillary bones. Next succeeds a portion of jaw with concave outline occupied by small teeth, which sometimes become larger from before backward; these are the premolars. And, lastly, there are teeth in another concave region which have the position of molars; these may, in the young animal, all be contained in a groove, with sockets scarcely better indicated than among Ichthyosaurs or some Cetaceans. In many Teleosaurs and Plesiosaurs the incisor teeth are relatively large, and the succeeding molars are smaller; and in the Ornithosaur *Dimorphodon* the incisor teeth are exceptionally large as compared with the molars. The teeth of South African reptiles termed Theriodontia differ from such types chiefly in the development of large canines. The incisors remain large, the canines are larger, and the molars relatively small, as may be seen in such genera as *Cynodraco* and *Lycosaurus*. In this group the incisors have both crown and root compressed from side to side. The crown often has a prominent sharp chisel-like external cusp, and a small internal cusp which gives the tooth a mammalian aspect. This character is well seen in the Russian genus *Deuterosaurus*, as figured by Eichwald and by Mr. Twelvetrees, the latter specimen being in the National Collection. A similar condition, but with the inner cusp less conspicuous, is seen in a new genus from South Africa allied to *Deuterosaurus*, here figured, which may be named *Glaridodon*. In this tooth, besides the elevated outer and inner cusps, there are on both sides elevated lateral borders to the crown, so that it includes a concave area, which in mode of formation of the concavity may be compared to the concave crown of the molar tooth of *Ornithorhynchus*, though the proportions of the tooth are dissimilar. Yet if a tooth of this type is supposed to lose its root by degeneration, it might show a close approximation to the tooth of such a mammal as *Ornithorhynchus*. The canine teeth in Theriodonts, like those of some of the lower mammalian orders, appear to be placed in the maxillary bone, and not in the suture

between that bone and the premaxillary, as in the higher mammals. As Sir Richard Owen has shown, these teeth in size, form, and serration are altogether like canines of carnivorous mammals. The molar teeth of Theriodonts are usually but little specialised, and are small and often simple cones. Even in *Glesaurus* the crowns of the molars are compressed from side to side, and they have a central cusp no more developed than in a lizard, with a smaller cusp on each side, much as in some seals and porpoises, and as among porpoises there is a long single root.

An American genus, *Empedias*, from Permian or Triassic rocks, referred by Professor Cope to a distinct order, the Pelycosauria, shows an unusual specialisation of the molar teeth. They are compressed from front to back, so as to have a great transverse extension on the palate, which is absent from the premolars. There is a contraction below the crown which is quite mammalian, and the root is single. The crown may be described as having three cusps. The median central cusp is the most elevated, and is the only one which shows evidence of wear, but the external and internal limits of the crown are both elevated above the level of the concave spaces which divide them from the middle cusp. Hence the tooth offers some evidence of three cusps in parallel series as a reptilian character, and so far helps to approximate reptilian and mammalian types. This dental condition in *Empedias* has its chief interest in an approximation which it makes to the Golden Cape Mole, *Chrysochloris aurea*. Its teeth are rather more numerous in the premolar region, but otherwise the molars in the mammal similarly have one root; they have the same transverse extension with three cusps, of which the middle one is similarly well-developed, so that the chief differences are that in *Chrysochloris* the crown is wide on the outer margin and narrows internally as a wedge, while the external cusp is subdivided into two. The lower jaw teeth of *Empedias* resembles those in the skull, but in *Chrysochloris* the mandibular teeth are bicuspid, except that the first two molars have the inner cusp divided longitudinally. In the accompanying figures these genera are contrasted; and if *Galesaurus* suggests a primitive mammalian type allied in dentition to seals, *Empedias* as strikingly resembles an insectivorous mammal.

The Lacertilia include many types of dentition, among which are genera with characters suggestively mammalian both in the grouping of the teeth and forms of the crown.

In the Frilled Lizard, *Chlamydosaurus*, there is one canine tooth

at each anterior angle of the lower jaw, and these teeth are separated from each other by small incisors. In the skull there are on each side in corresponding positions two canine teeth placed side by side laterally in succession to each other.

In most lizards, as in many mammals, canine teeth are absent; and sometimes there is a more or less marked gap in the positions in which they might occur.

The teeth which are in the position of molars may exhibit modifications in the forms of the crown which correspond to premolars and molars. Thus, in species of *Teius*, there are five or six bicuspid teeth which have the cusps one internal to the other,\* while in front of them are about seven teeth with single cusps which correspond to the outer cusps of the posterior part of the series. In this genus there is a longitudinal channel between the cusps of the molar teeth. Seen from the palatal aspect the crown of a tooth is sub-quadrate, and the external cusp is the more elevated, so that the tooth has an aspect which is insectivorous rather than edentate. Both cusps are compressed so as to form sharp longitudinal cutting edges. At their bases they are connected on both the anterior and posterior borders of the tooth by low transverse concave ridges. In my specimen these transverse ridges are sufficiently marked in the skull, but are stronger in the lower jaw, where their surfaces are not quite smooth. If the anterior and posterior ridges were stronger, the crown of this tooth in quadrate form, external and internal cusps and elevated border, would be sufficiently similar to the tooth of *Ornithorhynchus* to give some ground for regarding that tooth as reptilian in plan. And it has already been seen that in degeneration of the fang, which induced Sir R. Owen to compare the teeth to those of the reptile genus *Placodus*, and in implantation in a groove in the jaws there is no departure from reptilian types. If the tooth of the *Ornithorhynchus* as a whole cannot be exactly paralleled in any other animal, it is at least evident that the teeth are as reptilian as the skeleton; and if the correspondence is not closer, the reason may be found in the degeneration which has replaced the enamel of the tooth with horny matter.

Modern lizards are not a group of animals in which theoretical

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\* I have on more than one occasion inadvertently attributed this character to the genus *Cnemidophorus*, as my specimen was so labelled when it came into my possession. I am indebted to Mr. Boulenger for rectification, and whenever I have referred to the character it should be associated with the genus *Teius*.

considerations would suggest a search for mammalian characters in the teeth, but they happen to be the only group of Reptilia which is at all well known in which the teeth show a diversity which is in any degree comparable with the diversity of mammalian teeth. Whether those characters have been inherited from remote ancestry, or spontaneously developed in their possessors under varying conditions of existence, as seems probable, is a matter of small moment, for in either case they throw illustrative light on the classificational value of teeth of mammalia. If the different forms of cusp development found in lizards could be combined, teeth would result with crowns like the cuspidate crowns of many mammals. Thus, in *Cnemidophorus* there are two cusps arranged longitudinally; in *Ameiva* the tooth may have one large cusp with a small cusp by its side, or in the fore-part of the jaw there may be a small cusp on each side. If this kind of serration were combined with the transversely bicuspid teeth of *Teius* or of *Empedias* crowns would result which would have mammalian patterns. In *Amblyrhynchus cristatus* the external part of the crown is deeply cleft so as to be divided much as in some seals into a median denticle, flanked by a lateral denticle on each side; but on the internal side the base of the crown thickens, forming a large flattened oblique area, which is evidently an undivided internal cusp, like the internal incisor cusp of *Deuterosaurus*, for it is equally developed in successional teeth which have not come into use. Thus, *Amblyrhynchus* makes a partial combination of the characters *Ameiva* and *Teius*, and shows what may be termed a sub-mammalian type.

The teeth of *Iguana* are serrate and acuminate, but if they were supposed to lose the acuminate character by all the denticles growing to the same height from a depressed base, then the parallel vertical serrations would reproduce the incisors of *Galeopithecus*; and that the incisors have originated in some such way is suggested by the premolars in that genus being acuminate and serrated. The grooved tooth of *Plagiaulax* and *Hypsiptymnus* is equally suggestive of the origin of complicated molars from a simpler form such as may be found in reptiles. It is well to remember, as showing how difficult it is to recognise class characters in the form of a tooth crown, that a naturalist so familiar with mammals as De Blainville was of opinion that the small mammalian jaws from Stonesfield, known as *Amphitherium*, were the jaws of reptiles, before Sir R. Owen demonstrated that the molar teeth possessed two roots. But whether the molar



teeth of mammals were evolved out of simple reptilian types of teeth such as have been discussed as consequences of other changes in the skull, or are due to the influence of habitual food on inherited structure, it is to be anticipated that the primitive mammals possessed teeth of reptilian type less differentiated than the molar teeth of some existing lizards.

### THE DENTAL HOSPITAL OF LONDON.

THE annual distribution of prizes to the successful students of the London School of Dental Surgery took place on Friday, July 20th, at the Hospital, Leicester Square, and, in connection with it, a *conversazione* was held. Those who were familiar with the everyday appearance of the hospital found a difficulty in recognising it in its holiday garb. The theatre—accustomed to the teachings of the Gamaliels of the profession, and to the learned papers and discussions of the Odontological Society—with its elegant drapery and tasteful floral decorations, its brilliant gathering of beauty and talent, its mirth and gaiety, seemed quite given up to enjoyment and frivolity. The general transformation, too, reminded one of Mr. Barney Maguire's description of Westminster Abbey on Coronation Day:

" There were cakes and apples  
In all the chapels."

Sir Edwin Saunders received the company, and the Prizes were distributed by the Right Hon. the Earl of Lathom, P.C., who opened the proceedings by calling upon the Dean (Mr. Morton Smaile) to read his report.

MY LORD, SIR EDWIN SAUNDERS, LADIES AND GENTLEMEN,—I am sorry to weary you with any words of mine on this occasion, but it is necessary that I should say a few words to you in the form of a report.

At a similar gathering held last year in the Medical Society's rooms, it was pointed out that the increased demands made upon this hospital called for immediate enlargement of the building. During the past year this want has been met, and for the first time in the history of the Dental Hospital of London the distribution of prizes is held in a hospital somewhat adequate to the requirements of the school.

Thanks to Sir Edwin Saunders, who at all times labours indefatigably for the welfare of this institution, the improvements brought

about by the alterations provide us with this handsome theatre, a stopping or filling room at the top of the house, with no less than forty-five operating chairs in daily use (but which, to-night, is used for the purpose of stopping and filling of a different character, for it is the refreshment room), large and commodious waiting rooms, extracting rooms, anæsthetic room, and a room for the treatment of irregularities of children's teeth, and, in addition, students' room and lavatories.

The teaching is of so thorough a character that it is impossible or next to impossible for any student to leave the hospital an indifferent operator. I look forward but a short time, when I hope to see the public provided with dental practitioners worthy of themselves and of their *Alma Mater*.

The school continues its prosperous career ; there are nearly 100 students on the books, and I am proud to be able to say of them, that if their future can be judged by the present, the British public will have great cause to thank this institution for the admirable work being done in its school.

Our school is not altogether like that attached to a general hospital, for, after due and careful training, a very large proportion of the operations, which amount to over 4,000 a month, are, under careful supervision, actually done by the students themselves, thus giving them manual dexterity, and, at the same time, providing the necessitous classes with dental treatment.

At the Royal College of Surgeons, where our students are examined for the dental license (the so-called L.D.S.) our pass list maintains its position, nearly all the candidates having been successful at the two examinations held during the year, while a large proportion of our men are taking, in addition to their dental qualification, the M.R.C.S. and L.R.C.P.

At Charing Cross Hospital, where most of our students receive their medical training (they having in addition to the two years spent here to spend two also at a general hospital), a large proportion of the honours annually distributed have been won by our students.

Of our own prize list, I should wish to say that the Saunders' Scholarship, so generously endowed by Sir Edwin Saunders, has been won this year by Mr. W. H. Dolamore, he, as you will see by the prize list, having taken all the first prizes, with the exception of one, and in addition passed the primary examination for the F.R.C.S., so that, as is so often the case, our best man is best in

every sense; not only is he the best theoretically, but he has taken the operating prize awarded to the best operator for the year, and he deserves the success that I am sure will follow him through life.

I regret to have to announce that Mr. Hutchinson, who for twelve years has been actively connected with the teaching staff, has found it necessary to resign his appointment as lecturer, a step we all very much regret, but hope his successor may fill the position with the same credit to himself and good to the students that has characterised Mr. Hutchinson's tenure of that office.

In conclusion, our thanks are due to you all for the honour you do us by your presence; especially are our thanks due to the ladies who have graced our gathering—giving encouragement to the victors and the vanquished alike. To the former, of course, their plaudits must go, but to the latter I am sure they would say, if I interpret them aright, "All is not over! the prizes of life are still open to you—and many of you in the future, it may be young and inexperienced now, will strive after and obtain that best of all prizes, an honourable name and the respect, not only of your patients, but of your professional brethren."

The Earl of LATHOM then distributed the prizes as follows:—

*Saunders Scholar*, Mr. W. H. Dolamore; *Ashs' Prize* (given by Messrs. Ash & Sons), Mr. W. H. Dolamore; *Proxime Accessit*, Mr. J. H. Day.

#### CLASS PRIZES, WINTER SESSION, 1887-8.

*Mechanical Dentistry*.—1st Prize, Mr. E. A. Manton. 2nd Prize, Mr. A. Black. Certificates, Messrs. E. J. Preedy, H. L. C. Hope, F. A. Harsant, R. H. Bates and A. W. W. Hoffman.

*Metallurgy*.—1st Prize, Mr. W. Dolamore. 2nd Prize, Mr. F. A. Harsant. Certificates, Messrs. J. G. Turner and H. A. Washbourn.

*Prize in Operative Dental Surgery*.—1st Prize, Mr. W. H. Dolamore. 2nd Prize, Mr. R. H. Bates. Certificates, Messrs. F. A. Harsant, A. D. Horne and J. G. Turner.

#### CLASS PRIZES, SUMMER SESSION, 1888.

*Dental Anatomy*.—1st Prize, Mr. W. H. Dolamore. 2nd Prize, Mr. E. H. Manton. Certificates, Messrs. F. C. Porter and F. A. Harsant.

*Dental Surgery*.—1st Prize, Mr. W. H. Dolamore. 2nd Prize, Mr. J. G. Turner. Certificates, Messrs. J. Dunlop, J. A. Mallet, F. C. Porter, A. R. Colyer and A. W. W. Hoffman.

The prizes having been distributed, the noble Earl alluded to the rise and progress of the dental profession, and said :—My first business is most heartily to congratulate those successful students to whom I have had the pleasure of handing prizes. I will not make invidious comparisons, but I am sure I shall have your cordial and unanimous concurrence in specially recognising the distinction which Mr. Dolamore has earned for himself and has reflected on the school. He is justified, I think, in a feeling of pride in having taken all the first prizes that were to be had but one, and in that subject I observe his name is not mentioned at all, from which it is fair to infer that he did not take the subject up, and that he would have taken the first prize had he done so. To all the students I wish most sincerely and heartily success in their career, and I would add, may they never forget what they owe to this hospital. There is one thing that I am perfectly certain of, and that is, that not only are the students and the hospital to be congratulated, but the public, also, are to be congratulated upon the earnest work which is being done here—of which these awards are but a partial recognition—and upon the fact that young men are now being launched into the profession thoroughly skilled in the knowledge and treatment of diseases of the teeth—diseases from which, unfortunately, few of us are entirely free. Possibly my own conviction may not be entirely devoid of consolation and encouragement to those who are about to look to their profession for their income, and, therefore, I will say that, whatever else may happen, of this I am confident, there will always be plenty of work for them. Not very long ago, I dug up a skeleton that was 300 years old, and the teeth were nearly all of them in a state of decay, and from all one has heard there is little reason to doubt that toothache has existed since the world began. I, myself, come from a county where teeth are almost unknown—the county of Lancashire. How far this is due to the absence of lime, to dampness and peculiarities of soil, I will not attempt to determine, but it is an extraordinary fact that you might there see crowds of people with their mouths wide open, cheering loudly in the street, and not a tooth among them. Therefore, I need hardly tell you, I thoroughly appreciate the office of the dentist. There is no doubt whatever that a great work is being done by this hospital, but there seems scope for very large extension. I asked the question if it were possible for one hospital to meet the demand of this great city, or to educate all the students wishing to practise in London, and I have



been told it is not possible. This only shows there is room for further development. No doubt great encouragement and a great impetus in the direction of raising the status and efficiency of the profession has been given in the establishment of the licentiate qualification. By the way, I observe that in England there is only one board, while in Scotland there are two. I should like to know why this is; is it due to any peculiarity in the Scottish mental character? Anyhow, what I would say is, that I hope that this hospital will continue to receive the encouragement it deserves, and I am quite certain that those who come afterwards will please the founders and those who support it by striving to maintain and increase its reputation.

I was asked to mention one thing, and I do it with a thrill through my body. One of the things very much wanted in this hospital, I understand, is the use of steam. I dare say that not a few of the uninitiated of my hearers will say what is that for? But when I am told of the many delicate operations performed with a drill, I can quite understand it, for to use this drill it is necessary to use a pedal, and having attempted to do a little with a lathe myself, I can quite understand how impossible it would be at the same time to drive a wheel with the foot and keep the hand perfectly steady; however, I should have thought the delicate machine we all know of in connection with the barber's shop—a gentleman behind a wall turning a big wheel—would have answered the purpose, but I have no doubt I am wrong.

We have had lately a great many reminiscences and biographies published. I should very much like to see the reminiscences of some eminent dentist. I am sure they would be very interesting, full of entertaining stories, and in formation both instructive and amusing. Let us hope that one of those of senior rank, who has been associated with the dental reform movement, and whose large practice has brought him in contact with "all sorts and conditions of men," will take us a little behind the scenes and show us what the life of a great dentist is like.

In conclusion, let me once again wish the students every success, and at the same time permit me to congratulate Sir Edwin Saunders upon an association with this institute which is so creditable to him and has been of so much benefit and advantage to the profession.

A vote of thanks to Lord Lathom was proposed by

Sir EDWIN SAUNDERS, who said: Ladies and gentlemen, I feel

pretty sure of your concurrence in proposing a vote of thanks to Lord Lathom for so kindly acceding to our request to favour us with his encouraging presence on this occasion. It has always been the aim of the authorities connected with this hospital and school, as it is, indeed, mostly the aim of similar institutions, to secure for President, in such circumstances as we are met this evening, some one eminent by birth, scientific attainment, social rank or distinction in arts or letters, recognising in this the tendency in our nature—of which we are all more or less conscious—to gauge the value of a gift or award less by its intrinsic worth than by the circumstances in which it is received. Ophelia, in those tender accents of reproach—put into her mouth not by Lord Bacon, but by our beloved Shakespeare—says,

“ Rich gifts wax poor when givers are unkind ; ”

and so, conversely, the fortunate recipients of prizes this evening will be apt to feel that the value of each prize is enhanced by the kind and gracious words with which it was accompanied. One of my most precious possessions is a volume containing the literary remains of Henry Kirk Whyte, an author little known to this generation, but by whose early death the world is the loser of much graceful poetry. This volume is dear to me from the circumstance that it was given as a prize by that orator and erratic genius, Edward Irving, who drew all London and the men of light and leading after him by his fervid and impassioned eloquence. That circumstance and that occasion made an indelible impression on my heart, and so in like manner will the prizemen of to-day, in years to come, look back upon the year of the three eights, and remember with pleasure having received their award from the hands of the nobleman who, notwithstanding the numerous claims of society, of public and private affairs, has yet been able to favour us by presiding at this interesting function. And now, my lord, in the name of the Committee of Management, of the professors and surgical staff, and the ladies and gentlemen present, of our friends and sympathisers in our work, and of the *alumni*, whose aspirations have been so fully realized, I beg you to accept our sincere and hearty thanks.

Lord LATHOM briefly acknowledged the vote, and the company, upon the invitation of the Dean, circulated through the building—so that the air might have a chance of circulating in the theatre—beguiling a few minutes with strawberries and cream and other

"light refreshments," interviewing the wonderful phonograph provided for their amusement in a side room, and then returning to the theatre to be entertained with Mr. Bertram's clever feats of legerdemain, and Mr. Eric Lewis's artistic and humorous musical sketches, something after Corney Grain. Mr. Bertram, in selecting a gentleman to see that "he did not cheat the audience," showed himself a keen judge of character when he pounced upon the genial Mr. Sibley, whose kindly and trustful face proclaims him a man who "thinketh no evil" of anyone. The time passed very pleasantly, and when the company dispersed everyone felt that a most enjoyable evening had been spent.

The Medical Committee are to be congratulated upon the excellence of their arrangements for the comfort of their guests on this, the first, prize distribution within their own walls.

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### NATIONAL DENTAL COLLEGE.

THE Annual Distribution of Prizes to the successful Students of this School took place on July 5th, at the Freemasons' Tavern. Mr. FELIX WEISS, L.D.S.Eng., presided.

The DEAN read the following Report :—

During the past academical year there have been 19 entries, and there now remain on our books 31 students who are still under the the maternal wing of the institution.

Five students have qualified.

The Rymer Gold Medal has been awarded to Mr. Rushton, who has also won the Prize Medal for Dental Anatomy, the Prize of the Students' Society, and also two Certificates of Honour. Mr. Fogg has been awarded the Prize Medal for Mechanics and for Operative Dental Surgery. Mr. Haycroft is to receive the Prize Medal for Metallurgy, Mr. Clark for Dental Materia Medica, Mr. A. S. Jones for Dental Surgery, and Mr. Field the Prize for the best Mechanical Work. Certificates of honour have been awarded to Mr. Lankester, Mr. Dunlop, Mr. Faro and Mr. Field.

The Chair of Operative Dental Surgery, which was so successfully occupied by Dr. St. George Elliott since 1881, became vacant last year, and Dr. G. Cunningham was appointed successor.

The Medical Committee have expressed to Dr. Elliott their high appreciation of his services to the School, and everyone who has had the benefit of his teaching can bear testimony to its value.

The Lectureship on Histology, which Mr. Gaddes has held for ten years, was filled up by the appointment of Dr. Maughan.

Like the subject of Operative Dental Surgery, Histology forms no part of the necessary studies of the dental student. These facts were considered by the Committee of the College to be weak points in the dental curriculum, and therefore they decided to teach them and thus to point out in what lines the education of the student could be improved. After ten years' experience, it was decided to continue to teach those subjects and to fill up the vacancies caused by the retirement of the two lecturers just named.

Last year the Committee discussed the proposal to form a post-graduate course of lectures and demonstrations. The scheme was unanimously considered a good one and was adopted. Under the auspices of the College, a series of nine lectures was inaugurated during the present session ; and it is satisfactory to announce that the number of entrants and the average attendance have exceeded expectations.

All these movements bear testimony to the assumption that this College is, at least, endeavouring to worthily fill its position as an educational institution.

Mr. FELIX WEISS then proceeded to hand the prizes and certificates to the successful competitors, accompanying each award with a few felicitous words of commendation or encouragement.

At the conclusion of the distribution Mr. Weiss delivered the following address, which was warmly applauded :—

It affords me a great deal of pleasure in being allowed to present these prizes, and more particularly to congratulate the students of this institution upon the several proofs they have given us of their ability, their industry and their skill. To me the task is especially gratifying, and I feel highly honoured in being allowed to address those who are entering a profession to which I have devoted the energy of my whole life. I cannot fail to contrast the present with the past—the present all promise and advancement, the past all gloom and egotism. In no department of medical education is this contrast more strikingly exhibited than in the profession you are about to follow. The selfishness of most of those who practised this calling (for it could hardly be called a profession in those days) it would be difficult to exaggerate. Every man believed himself to be the fortunate possessor of secrets unknown to his neighbour, and he took the greatest pains to keep them to himself. Contrast this state



of things with what you see around you to-day. Every teacher in a school like this, and every officer in a dental hospital, is only too glad to give you all the knowledge he possesses—indeed, his greatest reward is to see the proficiency of his pupils and to mark the skill they display. I am quite convinced that the students of this school will bear me out in what I am saying, and will gratefully acknowledge the obligation they are under to their teachers, from the Dean to the youngest official in the hospital.

You have had from this chair many admirable addresses and much excellent advice, and I am not going to detain you by repeating what has been so ably said on former occasions. The names of Dr. Richardson, Sir Edwin Saunders, Mr. Luther Holden, Sir Erasmus Wilson, Lord Enfield, Sir Spencer Wells, Dr. Broadbent, Dr. Alfred Carpenter, Sir William MacCormac, and Mr. Thomas A. Rogers are known to you all, and I, the latest and the least worthy of this honour, thank you, ladies and gentlemen, for the interest you have taken and still take in our school.

I wish now simply to remind the students that the skilful architect, when he desires to erect some stately and enduring edifice, commences by laying a well-considered and durable foundation. He looks to the solid nature of its basis, and takes good care that it shall neither give way in after years or exhale from its loosely-packed material anything that might be hurtful in the future. This lesson should not be forgotten by you. The student should, during these years of study, lay such a foundation of useful information that in after life he may be able to recall at any moment some of that knowledge which he has stored away in the recesses of his memory. These are the days when impressions are vividly made, and as experience gives him the power to distinguish one fact from another, he looks with gratification to those studies which, perhaps, at the time he considered useless. The inexperienced miner may turn up diamonds and think them but pebble stones; he may despise the pyrites, when in truth, had he possessed more knowledge, he would have perceived the veins of gold that permeate its structure. Do not complain that you have too many subjects to study, but try rather to master them all with the full assurance that they will contribute to that perfect *ensemble* without which our knowledge must be but elementary. Those who remain throughout their lives attentive students will value that modesty which makes them ever ready to learn, and I would strongly advise those who have passed

through their pupilage to note each week, each day, nay, each hour, the facts that come before them. It is one of the crying evils of the age we live in that men frequently consider their experience unworthy of attention or record, without remembering that out of the multitude of trifles springs the confirmation of every important truth. Try and enforce the habit of recording what you see, and cultivate the ability to describe what is brought before you.

I have but one subject further to dwell upon—the manner in which you conduct your practice. Never forget that you are now by education legally entitled to regard yourselves as members of a profession second to none. Do not bring it to the level of a mere trade, but try and cultivate those higher classes of study and thought which mark the true professional man and scholar. You may be dazzled by the temptations that advertisement holds out, but you will find the more you examine these alluring means of making money the more delusive they become. Honourably set yourself to gather around you a connection that believes in your ability, your integrity and your honour. This will never desert you; but the practice that results from self-laudation and advertised excellence can never be depended on. You pay for your introduction, and by payment you will have to continue to uphold yourself, and when you have no longer a name worthy of respect the attractions of the true professional life will the more appear and torment you. In many ways it will be profitable for you to follow the example of your medical compeers, and by associating yourself with the College of Surgeons you will at least have the satisfaction of knowing that you are affiliated to one of the oldest and one of our best respected institutions.

These are your early days, but while following them, remember that a time may come when your past life may be stretched out like a chart before you; take the greatest care that this chart be free from blots. The satisfaction of a well-spent life is something, but the gratification and the honour that illumines your declining years when surrounded by the members of your own profession is the reward most keenly felt. Students, do not forget that upon you rests the renown, the stability and the honour of our profession in the future. Try, if anything, to surpass those who have gone before, for you have had advantages they never possessed. We, who have passed through the heat and burden of the day, look for you to prove yourselves honourable successors, abhorring those things

we have abhorred, and following that path of integrity we have tried to point out to you, so that, when you come to transmit to your successors the record of the past, you may be able to say, "My labour has not been all in vain; these are the fruits we desire to cultivate, and this the legacy we desire to leave."

In reply to a vote of thanks,

Mr. FELIX WEISS, who was very cordially received, said: I very highly value this proof of your kindly feeling. I do not know that I am exactly equal now to duties which at one time I might have considered easy, and I take your too appreciative reception of me as a recognition also of some of those attempts—I can only call them attempts—which I have made to, in some way, improve our profession. There is no doubt that in all honest effort to contribute to the well-being of society there is a sufficient recompense in the knowledge that even if our energies have not availed much they have been engaged on the right side, and I feel a sufficient reward if I have in some small way helped to push the ball of dental education up the hill. It is for you, students of to-day, to keep it there; to realize the advantages you have derived from the efforts of those who have preceded you, and to recognise your responsibility to a profession worthy of your best endeavours to maintain, and still further elevate its position.

The evening's proceedings agreeably commenced with a Cinderella dance, which was largely attended, the prize distribution taking place in the interval, about 10 o'clock. After the distribution dancing was resumed.

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## PASS LIST.

### ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following gentlemen, having passed the necessary examination, were admitted Licentiates in Dental Surgery on June 20th:—Reginald Henry Bates, Vincent Square, Westminster; Thomas Edward Constant, Harmer Street, Gravesend; Everard Digby, Ruskin Road, Tottenham; Edgar Charles Fisk, High Road, Kilburn; Theodore William Harris, Oak Lodge, Argyll Road, Ealing; William Arthur Hooton, Kersal Towers, Higher Broughton; Albert Driver Horne, Abbeville Road, North Clapham; William James McDonald, Egbert Street, St. George's Road; Thomas Samuel Minett, Chesterton Road; Richard Theodore Stack, Westland Road,

Dublin; Frederick Todd, Clock House, Catford Bridge; Henry Addison Washbourn, The Bank House, Middlesborough.

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#### ROYAL COLLEGE OF SURGEONS, EDINBURGH.

DURING the July sittings of the Examiners the following gentlemen passed the First Professional Examination for the License in Dental Surgery:—Frederick John Bonnalie, Chester; Andrew Kinsman Brittan, Devonshire; Alexander Kay Finlayson, Leith; John Alexander White Kirkpatrick, Leith; Henry Reginald Fryer Brooks, Banbury; James Seymour Allen, Derbyshire; John Henry Cormack, Edinburgh; Frederick Leonard Floyd Masters, Huddersfield; Lawson Storrow Shennan, Houghton-le-Spring; John Henry Larbatestier, Southampton; Herbert Sydney Welham, London.

The following gentlemen passed the Final Examination, and were admitted L.D.S. Edinburgh:—Henry Reginald Fryer Brooks, Oxfordshire; Henry Brooke Dew, Somersetshire; and David Alexander Cormack, Edinburgh.

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#### CORRESPONDENCE.

*(We do not hold ourselves responsible for the opinions expressed by our Correspondents.)*

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#### TIN AND GOLD PLUGS.

*To the Editor of the DENTAL RECORD.*

SIR,—The following correspondence, which is just to hand, settles very clearly the absence of any claim of Dr. Abbott to the use of this combination. My previous statements are more than proved, as the correspondence shows that Dr. Abbott not only has no claim whatever, but that he "scouted the idea," and only adopted it after very positive proof that the system was better than his own.

Although not connected directly with the question of gold filling, I retain sufficient interest in the art and sufficient desire that a good operator with original ideas shall be fairly recorded, to be pleased that my constant advocacy for Mr. Lomax should be so thoroughly proved to be correct, and it is well that the matter should be so clearly settled.

THOS. FLETCHER, F.C.S.

Warrington, July 13th, 1888.

[COPY.]

1, BURLINGTON STREET, OXFORD STREET,  
MANCHESTER.

July 10th, 1888.

DEAR FLETCHER,—Visiting Manchester for a few days, I have had my attention called for the first time to some lectures reported in the DENTAL RECORD on the subject of gold and tin fillings, by Dr. Miller, of Berlin.

I notice the claim made to the discovery for this mode of filling by Dr. Miller for his father-in-law, the late Dr. Abbott, of Berlin, and your letter



asserting that fillings made by me were well before the public long before the date named as the time Dr. Abbott *discovered* this mode of practice.

Enclosed you will find two notes sent to me by Dr. Miller, inspired, no doubt, by your letter in the January number of the RECORD. In my reply, I stated that in 1853 I called on Dr. Abbott, and amongst other subjects discussed the merits of gold and tin as a filling; that he scouted the idea as being absurd, nothing but gold being admissible as a filling, according to his belief. After that time, Dr. Abbott had opportunities of seeing many fillings made by me with gold and tin, and I was aware of his afterwards trying the same in his own practice. I will now state to you how it came to pass that I first used gold and tin as a filling. About 1845 or 1846, Mr. Sidney, who practised here, and who paid much attention to the filling of teeth, used to employ tin for large cavities in bicuspid and molar teeth. These fillings were very well made; but when on a masticating surface I noticed they quickly wore down and assumed a cuplike shape, the edges of the cavities becoming exposed, and eventual failure being the result. Noticing the merits of tin as a filling, I thought, by adding gold to that material, I should probably get over the defect of softness. You and many other dentists must be very familiar with the result, and I dare say most of my dental friends are weary of hearing me advocate the merits of gold and tin, which I did both in and out of season.

I send the two notes from Dr. Miller, with a translation of the one in German, for your perusal—notice the dates. Return to me at your convenience. I thought you might like to have these particulars, as your letter to the RECORD told me you took a sufficiently lively interest in the subject to prevent any little merit there may be in the application of gold and tin as a filling being diverted from its true source.

I am, dear Fletcher,

Yours truly,

(Signed)

J. W. LOMAX.

[COPY.]

January 17th, 1888.

DEAR MADAM,—I should be very much obliged if you could let me know if Mr. James Lomax, of Manchester, still practises, and if he was acquainted with my father-in-law; and if he used tin and gold for filling teeth? You must forgive me for asking so many questions at the same time. It is a question if it were Mr. Lomax, of Manchester, Dr. Abbott, of Berlin, or Dr. Spooner, in America, who first used the now celebrated combination of tin and gold.

(Signed)

PROF. MILLER.

[COPY.]

January 24th, 1888.

MR. JAMES LOMAX.

DEAR SIR,—Allow me to thank you for your kind response to my enquiries. I would still like to ask whether you have found that the combination is sufficiently hard to withstand mastication on the grinding surface? Also, how you account for the hardening of the material? 3rd, What effect moisture has upon the filling; that is, is the filling materially injured by the access of saliva during the operation? 4th, In what way do you think the gold deteriorates by lying in contact with tin? 5th, Do you fold the tin or the gold outside? Will you allow me to make use of your letter and your answers to the above questions in any communication that I may make upon this subject to the journals?

With many thanks for your kindness,

I am, dear Sir,

Very truly yours,

(Signed)

W. D. MILLER.

[Having recently had the pleasure of seeing Prof. Miller, he requested the republication of his former letter, which appeared at p. 96.—Ed.]

*To the Editor of THE DENTAL RECORD.*

SIR,—On page 44 of your issue for January, 1888, your correspondent objects to "another attempt to give to Dr. Abbot, of Berlin, the credit of having first made use of a combination of gold and tin foil." If your correspondent will kindly refer to the "Independent Practitioner" for 1884, page 403, or to the "Correspondenzblatt für Zahnärzte," 1884, page 274, or to Poulson's "Viertel-jährlicher Bericht," No. 6, he will find the following account:—About — years ago a gentleman called upon Dr. Abbot of Berlin to have his teeth examined. In one of his teeth Dr. Abbot found a discolored filling having the appearance of amalgam, and remarked that it was the best amalgam filling he had ever seen, to which it was replied that the filling was not of amalgam, but of a mixture of tin and gold foils. Since that time Dr. Abbot used this material, &c., &c.

I omitted this story in the present instance, partly because I had repeated it on so many occasions that it seemed superfluous, and partly because I knew nothing whatever of the previous history of the filling referred to above. Dr. Abbot never claimed for a moment to have originated the practice. As far as the mere question of priority in the use of the combination is concerned, if we would do full justice, we must go many years beyond Mr. Lomax, to Dr. Spooner, who, we are told (*Cosmos*, 1888, p. 37), made use of the combination 50 or 60 years ago. I was much surprised to find that the combination had been extensively used in certain districts of England by Mr. Lomax, Mr. Martin and others. It is to be regretted that the methods employed by these gentlemen, and the results obtained by them, were not made known to the profession at large. The credit of having done this must remain, I think, with Dr. Abbot, or with those who learned directly from him. One part of the correspondence I particularly value, *i.e.*, the statement by your correspondent that he constantly saw *very old and perfect* fillings made of the combination of tin and gold.

Berlin.

Yours, &c., W. D. MILLER.

## LOWER MOLAR ROOT FORCEPS.

*To the Editor of the DENTAL RECORD.*

SIR,—Thinking that some of your readers have felt the want of a forceps that will at all times grasp both roots of an inferior molar. I send the description of a pair that I had made for me by the Dental Manufacturing Company, which answer the purpose for which they were made admirably.

They are made on the pattern of the "Ladmore," but with this difference: the front beak is made so that it will rotate on a stout pivot through the head, so that it readily adapts itself to the varying sizes and forms of the two roots. In its construction, it is essential to bear in mind that the point of the cusp of the movable beak, that passes between the roots, should be in the prolongation of the axis of rotation.

With this forceps I am enabled to extract the whole of a lower molar at once, even though the roots are separated.

In applying it to a tooth, the movable beak must first be put in position and the forceps closed and pushed home, when it will grasp both roots firmly.

It can be used for both sides of the mouth.

I am, Sir,

Your obedient Servant,

F. CHASEMORE.

82, High Street, Putney, July 20th, 1888.

## Editorial.

### UNIVERSITY DEGREES IN DENTISTRY.

FOUR branches of the British Dental Association have, since the month of May last, urged the Representative Board of the Association to give some attention to the present opportunities for promoting higher (University) degrees in dentistry. It was in January, 1886, that the importance of this question, as related to the proposed new teaching university in London, was set forth in the editorial pages of the DENTAL RECORD. Again, in March, 1887, the subject was once more referred to. Gases diffuse slowly, so also do other things. But now, after two years-and-a-half of the apathetic slumber which has hitherto characterised the profession, the Scottish Branch of the Association awakens to see the desirability of Dentistry being recognised by the ancient universities of the North. The branch resolved:—

“That the Representative Board of the British Dental Association should be asked to approach, or take such steps as are open to them to move, the Commission appointed in connection with the Universities’ (Scotland) Bill, to empower the Universities to institute a Degree in Dentistry.”

This resolution has been supported by three other Branches of the Association, and possibly some action may shortly be taken with regard to the question of Higher Degrees in Dentistry. Let the Representative Board appoint a committee to consider the whole subject of University Degrees in Dentistry. Action should now be quick, yet deliberate.

It may not be inopportune to repeat a suggestive question which was embodied in the article written in the number of this journal for January, 1886:—“Should a Dental Degree of the University be in Dentistry purely and simply, like the existing license; or should it, in virtue of a fuller curriculum and higher examination, be a degree conferring rights to registration in the Medical as well as in the Dentists’ Register?”

At all events, such a committee—call it “The Committee of Education and Examination,”—would have plenty of needful and useful work to do. In addition to this university work, there are the urgently required reforms in connection with the Royal College of Surgeons of England and Dental Education and Examination as mentioned in the editorial pages of the DENTAL RECORD for May, 1887, and for June last.

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## GOSSIP.

DR. PARMLEY BROWN, of New York, has concluded a very successful series of clinics at the United States Exchange Office, Strand. He has demonstrated the practicability of bridgework composed entirely of porcelain (he condemns the metal bridgework on the score of uncleanness). We understand that some members of the profession have carried away in their mouths specimens of this "all-porcelain" bridgework, and have promised to be present at the Manchester meeting. Many were heard to express themselves highly satisfied with what they saw, and certainly Dr. Brown's method of contouring gold was extremely rapid.

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MR. ARTHUR P. PENROSE, L.D.S.Glas.&I., has been appointed Dental Surgeon to the Islington Dispensary, *vice* Mr. E. Llewellyn Davies, L.D.S.Eng., resigned.

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At a recent meeting of the Islington Board of Guardians a discussion took place as to the appointment of a surgeon-dentist for the workhouse schools, as recommended by the School Committee. There was considerable opposition, and the matter was referred back to the School Committee for further report. Our contemporary, the *St. James's Gazette*, very justly says: "Whatever the result, there cannot be a doubt that the preservation of their teeth is a matter of no slight importance to pauper children. The rate of mortality among the poorer classes would perhaps be much reduced if more attention were paid to the condition of their teeth when young." On the ground of expenditure alone it would in all probability be found a saving. Wherever it has been tried it has been found to bring about the most beneficial results. In his last report, the resident medical officer at the Anerley schools (which was, we believe, the first charitable institution to appoint a dental surgeon) draws especial attention to this subject, as it came under his personal observation.—*Lancet*.

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THE remains of the mammoth *Elephas primogenus* have been discovered at Southall associated with flint implements—notably one, a spear head five inches in length. They were all embedded in sandy loam, underlying evenly stratified sandy gravel, upon which there was a deposit of brick earth. The tusks were attached to



the skull, parts of which, with the leg bones and teeth were exhumed.

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THE young cobra, seen as it is just emerging from the egg, says Mr. Phipson, has a tooth with which it cuts its way out. This tooth is shed so soon as it has fulfilled its purpose. Probably it is an incisor (on this point Mr. Phipson is silent), the remnant of those which once filled the space between the canines which now exist permanently in the venomous ophidia as poison fangs. Some future investigator may, perhaps, find in the embryonic state other incisors united with the intermaxillary bones, but which are never erupted. If it be so, it is another peg on which to hang the doctrine of the evolutionist—the survival of the fittest.

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THE return of two rich showers of meteors may be looked for on the 10th of this month, August, at which time they will reach their maximum.

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It has been determined that there shall be at the Sorbonne a professorship for the exposition of the Darwinian theory.

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THE artificial cultivation of sponges is one of the latest novelties. Mr. Oscar Schmidt is said to have invented a method by which pieces of living sponge, when planted in suitable situations, will develop into specimens in the course of three years having a commercial value, while their cost will be but small.

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THE microscopical examination of thin plates of steel has been beautifully worked out by M. Wedding. He has enlisted the services of the solar rays, and after heating the plates to a white heat, has obtained photographs of them. These pictures are then studied under the microscope.

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THE injurious effects of an infusion of tea upon the teeth has been made the subject of a notice by Surgeon W. T. Black, in the *British Medical Journal*. He states that its effects are to bring on inflammation and eventually abscess of the fangs, &c., &c. Herein is a strange doctrine which deserves more than a passing notice. If Mr. Black's statement was but backed up by some well-marked cases, observed by himself, it would help us to the solution of a problem

which for years out of count has stirred the thoughts and imaginations of every thoughtful practitioner, especially where robust health has the accompaniment of seriously diseased dental organs. It is to be hoped that this statement of Surgeon Black will not be forgotten, but that every opportunity will be taken advantage of for testing its value.

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At the Ohio Cleveland Steel Works there is a magnetic crane for lifting steel ingots. The magnet consists of two rods of soft iron, covered with insulated wire, which receives the current from a battery or from a dynamo. It will lift 800 lbs. without difficulty. The substance to be lifted, it is presumed, forms the keeper.

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According to *Science*, the logs of the great timber raft, which was abandoned off the coast of New England, have drifted in a direction south-east by south, and the greater part of them are now in the region between the 33rd and 38th parallels and the 30th and 50th meridians.

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The application of electricity to lighting purposes was the outcome of Faraday's beautiful discovery of magneto-electric induction.

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HERR VON NATHUSIUS has demonstrated that the disease in the foot of the horse, known as grease, is the result of a parasite, *Symbiotes equi*.

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The new explosive, carbo-dynamite, for use in mines, is composed of 90 parts by weight of nitro-glycerine. These are absorbed by 10 parts of specially prepared carbon of very porous texture. It is stated to be more powerful than dynamite, and has the advantage that no noxious perfumes are given off; and, further, that it can be mixed with water, which at the time of explosion is converted into steam, and extinguishes flame. In fiery mines this must prove a great boon.

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An interesting illustration of Darwin's theory of the distribution of animals and plants by ocean currents has just been made known by a correspondent at Port Elizabeth, South Africa. A large husky

fruit was picked up on the coast the latter end of 1886. It contained a solitary nut, about  $1\frac{3}{4}$  inch round. This seed was planted and developed into a *Barringtonia speciosa*, a native of the East Indies and of the Moluccas. There was also picked up in the same place a sea snake, *Pelamis bicolor*, two large specimens of the ox-ray species, and a lot of pumice stone. The suggestion is that these are all relics of the Krokabao eruption of 1883.

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THE formation of coral reefs, the vexed question of naturalists of the present day, is to be discussed at the meeting of the British Association this year. The result will be awaited with interest by every disciple of Darwin, and equally so by the adherents to the Murray theory.

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THE *American Naturalist* for May gives a curious account of the scientific investigations of a monkey belonging to the National Museum of Washington. This creature, *Cercopithecus erythræa*, resides in a cage with four opossums. The keeper's attention was drawn to the cage by the excitement of a crowd in front of it. He found the monkey seated, and on his lap lay one of the opossums. The monkey had discovered the marsupial pouch of the latter, which he was investigating with great earnestness, and drew from it a tiny opossum, about two inches long, hairless and blind, but alive. After scrutinising it, he returned it to the pouch. Thus alone it became known that the opossum had young ones.

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ONE of the latest applications of electricity is the recording of moves in a game of chess. The recorder consists of a small motor driving a printing wheel, with which each square of the board is electrically connected. Each black piece has a peg of metal, while the white pieces are of insulating material. The printing is done on a tape, and is thus made to show whether the record relates to a white or black piece.

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THE laboratory of the Marine Biological Association erected at Plymouth was opened on the 30th June, when an address was delivered by Professor Flower, C.B., F.R.S. The object of this institution is the investigation of the phenomena of marine life in its bearing upon the economical interests involved in the fisheries of our island.

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DR. WARNER, in his communication to the Royal Society on Muscular Movements in Man and their Evolution in the Infant, says:—The new-born infant presents constant movement in all its parts while it is awake, and this is not controlled by impressions from without. This spontaneous movement appears to be of great importance, and is here termed microkinesis. It is argued that the mode of brain action which produces it is analogous to the action producing spontaneous movements in all young animals, and to the modes of cell growth which produce circummutation in young seedling plants. As this becomes modified by external forces to the modes of movement termed heliotropism, geotropism, &c., so microkinesis in the infant is replaced by the more complicated modes of brain action as evolution proceeds.

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AMONG the new mathematical instruments of the day is the oograph. It is designed to enable oologists to make diagrams of birds' eggs in their natural sizes and proportions.

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IN one of the photographs of lightning flashes received by the Royal Meteorological Society there is a *dark* flash of the same character as the bright flashes.

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PROFESSOR W. N. PARKER states that he has demonstrated the existence of poison glands in connection with the grooved dorsal and opercular spine of both the British species of weever. The glands are stated to be composed of large granular nucleated cells, which are continuous with those of the epidermis.

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NEAR the Olympieum at Athens has been found a magnificent statue of Antinous without arms.

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OF all Shakespeare's plays, there is none so important from a biographical point of view as "The Merry Wives of Windsor." The traditions relating to the favourite, Sir Thomas Lucy, and to Queen Elizabeth's command for the re-appearance of Falstaff, are indissolubly connected with it, and in a large measure are dependent on it for support.

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DURING the series of repairs to the north wall of Chester, twenty-seven monumental stones and inscriptions have been brought to light, many of which are of the highest interest.

CONSIDERABLE interest is just now centred in the planet Saturn in consequence of the discovery by Dom Lamy of four additional rings to the three already known. So long back as 1868 there was seen by this observer, certain points of light outside the long existing rings, which he could not, after most careful treatment, attribute either to atmospheric influences or to any optical defects in the telescope he used. Further investigation under more favourable circumstances has convinced him and other independent observers that the innermost is a luminous zone. This has been observed only on the side which turned towards the earth. It is frequently resolvable into a collection of luminous points scattered along an elliptical arc. Beyond this zone is an elliptical interval, whose darkness is often most marked. The second of the new rings begins as a nebulosity which gradually becomes more distinct up to the vicinity of the moon Enceladus. The third ring, the brightest of all the new ones, does not appear to pass beyond the orbit of Tethys, which satellite seems to graze its outer border. The fourth ring has been detected between Dione and Rhea. It would be temeritous to speculate on the significance of these new features, but possibilities are great, and the time may come when we may learn that these rings are other satellites just coming into existence.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, and at the Manchester Dental Hospital, from June 1st to June 30th, 1888 :—

				London.	National.	Victoria.
Number of Patients attended ...				—	2076	1100
Extractions	Children under 14	...	...	391	315	622
	Adults ...	...	...	1,126	545	
	Under Nitrous Oxide	...	...	708	886	20
Gold Stoppings ...				451	138	124
Other Stoppings...				1,181	753	134
Advice ...				133	603	—
Irregularities of the Teeth ...				151	241	—
Miscellaneous and Dressings ...				435	358	326
Total ...				4,576	3,839	1,246

# THE DENTAL RECORD.

VOL. VIII.

SEPTEMBER 1, 1888.

No. 9.

## Educational Section.

### SUGGESTIONS TO STUDENTS.

THE Professional Education of the Dental Student consists of:—

1. Apprenticeship, or instruction in Mechanical Dentistry, for a period of not less than three years.
2. Attendance on Lectures, &c., at a General Hospital and Medical School for two Winter and one Summer Sessions—eighteen months.
3. Also attendance at a Dental Hospital and School for two years.

The attendance at the General Medical and at the Special Dental Hospital and School may be carried on simultaneously, and completed in two years. This plan of work takes up the whole of the Student's time, and it is impossible for him to concurrently engage in any Mechanical, or other employment.

Before commencing his Professional Education (or apprenticeship), the Dental Student must pass a Preliminary Examination in Arts. The examination most to be recommended is the Matriculation of the University of London. Passing that examination will enable the student subsequently to present himself for an University degree, should he desire to do so. A list of the several examinations recognised by the General Medical Council as fulfilling the conditions required by that body regarding Preliminary Education is to be found on page 368.

Any one who commenced his Professional Education before the 22nd July, 1878, is exempt from the Preliminary Examination.

After passing a Preliminary Examination, the Student must receive at least eighteen months of the required three years' instruction in Mechanical Dentistry under a registered Dentist—*i.e.*, half of those three years may be taken before passing the Preliminary. But it should be distinctly understood that four years must be passed in Professional Study after registration. (See foot note, p. 374.)

Having received a certificate of his Preliminary Examination, and commenced his Professional Education, either by apprenticeship or by hospital studies, it is necessary to register the same at the Medical Council Office, 299, Oxford Street, London, W. This must be done within fifteen days from the commencement of the pupil's Professional Studies. The beginning of such studies will not be recognised by any of the Qualifying Bodies as dating earlier than fifteen days before the time of registration.

Any one registered as a Medical Student must also register as a Dental Student, if he be such.

Having served his articles, the Student may enter a General or a Dental Hospital, or both, and complete the curriculum of at least four years of study from the date of registration; after which he is eligible to be admitted to examination for the Dental License.

Though the possession of the License in Dental Surgery is necessary for a name to be entered on the *Dentists' Register*, the student is strongly recommended to obtain some additional qualification in Medicine, Surgery, and Midwifery. On the other hand, though a Medical, other than the special Dental qualification, entitles its possessor to practise Dentistry, yet the course of study for such does not include any Dental instruction. Therefore, to be a Dentist requires a more or less complete compliance with the Dental Curriculum.

It will be observed that the Curricula of the several Licensing Bodies differ somewhat from one another. The

Curriculum of the Royal College of Surgeons of England exceeds the minimum course of study recommended by the Medical Council by prescribing attendance upon a second course of lectures on Dental Anatomy, Dental Surgery and Dental Mechanics; so also does the Curriculum of the Royal College of Surgeons in Ireland, by requiring a course of Practical Physiology and an extra six months' General Hospital practice, besides three examinations at different periods. The Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, require only six, instead of not less than twelve, months' attendance at a recognised General Hospital, with clinical instruction.

The total amount of fees for the curriculum for the L.D.S. differs at the several schools, as shown below:—

	£	s.	d.
London (with London Dental) ... ..	73	12	0
London (with National Dental) ... ..	67	6	0
Birmingham ... ..	63	0	0
Liverpool ... ..	75	12	0
Manchester ... ..	73	2	0
Edinburgh ... ..	64	0	0
Glasgow ... ..	48	16	6
Dublin (Dental only) ... ..	31	10	0

In addition to the above fees there are £10 10s. for Diploma, and, say, £12 for books, instruments, &c., also any premium that may be paid for the necessary three years' articles. The fee for the diploma of the Royal College of Surgeons of Ireland is £21.

### REGISTRATION OF DENTAL STUDENTS.

The Registration of Dental Students is carried on at the Medical Council Office, 299, Oxford Street, London, W., in the same manner as the existing Registration of Medical Students and subject to the same regulations as regards Preliminary Examinations.

Students who commenced their professional education by apprenticeship to Dentists entitled to be registered, or by



attendance upon professional lectures, before July 22nd, 1878 (when Dental education became compulsory), shall not be required to produce evidence of having passed a Preliminary Examination.

Pupils who have been articled to their fathers or to brothers—with whom money transactions would be nominal—shall, in all other respects, be considered to be in the same position in regard to registration as those pupils provided for in the first part of Section 57 of the Dentists' Act, who have paid premiums for instruction.

Candidates may, however, pass eighteen months of the three years' instruction in Mechanical Dentistry before the date of their Registration as Students; but four years must be given subsequent to the date of passing the Preliminary Examination, as set forth in clause 2, page 373.

The privilege provided by the first clause of Section 37 of the Dentists' Act, for persons whose Articles of Apprenticeship expired before January 1st, 1880, shall be extended to all whose Articles had begun two years before that period.

The commencement of the course of Professional Study recognised by any of the Qualifying Bodies shall not be reckoned as dating earlier than fifteen days before the date of registration.

Forms for Registration may be obtained at the office of the General Medical Council. No fee is required for registration as a Student.

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## PRELIMINARY EDUCATION.

### REGULATIONS OF GENERAL MEDICAL COUNCIL.

No person shall be allowed to be registered as a Medical or a Dental Student unless he shall have previously passed (at one or more Examinations) a Preliminary Examination in the subjects of General Education as specified in the following List :—

1. English Language, including Grammar and Composition ;
2. Latin, including Grammar, Translation from specified authors, and Translation of essay passages not taken from such authors ;

3. Elements of Mathematics, comprising (α) Arithmetic, including Vulgar and Decimal Fractions, (β) Algebra, including Simple Equations, (γ) Geometry, including the first book of Euclid, with easy questions on the subject-matter of the same ;
4. Elementary Mechanics of Solids and Fluids, comprising the Elements of Statics, Dynamics, and Hydrostatics ;
5. One of the following optional subjects ;  
 (α) Greek ; (β) French ; (γ) German ; (δ) Italian ; (ε) any other Modern Language ; (ζ) Logic ; (η) Botany ; (θ) Zoology ; (ι) Elementary Chemistry.

The following is a list of Examining Bodies whose Examinations fulfil the conditions of the Medical Council as regards Preliminary Education, and entitle to Registration as Medical or Dental Student :—\*

#### I.—UNIVERSITIES IN THE UNITED KINGDOM.

##### UNIVERSITY OF OXFORD :—

1. Junior Local Examinations ; Certificate to include Latin and Mathematics, and also one of the following optional subjects :—Greek, French, German.
2. Senior Local Examinations ; Certificate to include Latin and Mathematics.
3. Responsions.
4. Moderations.
5. Examination for a Degree in Arts.

##### UNIVERSITY OF CAMBRIDGE :—

6. Junior Local Examinations ; Certificate to include Latin and Mathematics, and also one of the following optional subjects :—Greek, French, German.
7. Senior Local Examinations ; Certificate to include Latin and Mathematics.
8. Higher Local Examinations.
9. Previous Examinations.
10. Examination for a Degree in Arts.

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\* Provided that, in all cases, the subject of Mechanics, as set forth in the foregoing clause 4, be shown to have been included in the Examination.

## UNIVERSITY OF DURHAM :—

11. Examination for Certificate of Proficiency.
12. Examination for Students at the end of their first year.
13. Examination for a Degree in Arts.

## UNIVERSITY OF LONDON :—

14. Matriculation Examination.
15. Preliminary Scientific (M.B.) Examination.
16. Examination for a Degree in Arts or Science.

## VICTORIA UNIVERSITY :—

17. Preliminary Examination ; Latin to be one of the subjects.
18. Entrance Examination in Arts, to include all the subjects required.

## UNIVERSITY OF EDINBURGH :—

19. Local Examination (Junior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—  
Greek, French, German.
20. Local Examinations (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—  
Greek, French, German.
21. Preliminary Examination for Graduation in Science or Medicine and Surgery.
22. Examination for a Degree in Arts.

## UNIVERSITY OF ABERDEEN :—

23. Local Examination (Junior Certificate) ; Certificate to include all the subjects required.
24. Local Examinations (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—  
Greek, French, German.
25. Preliminary Examination for Graduation in Medicine or Surgery.
26. Examination for a Degree in Arts.

## UNIVERSITY OF GLASGOW :—

27. Local Examination (Junior Certificate) ; Certificate to include all the subjects required.

28. Local Examination (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—

Greek, French, German.

29. Preliminary Examination for Graduation in Medicine or Surgery.

30. Examination for a Degree in Arts.

#### UNIVERSITY OF ST. ANDREWS :—

31. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—

Greek, French, German.

32. Local Examination (Junior Certificate); to include all the subjects required.

33. Preliminary Examination for Graduation in Medicine or Surgery.

34. Examination for a degree in Arts.

#### UNIVERSITY OF DUBLIN :—

35. Public Entrance Examination.

36. General Examination at end of Senior Freshman year.

37. Examination for a Degree in Arts.

#### QUEEN'S UNIVERSITY IN IRELAND :—

38. Local Examinations for men and women; Certificate to include all the subjects required by the General Medical Council.

39. Entrance or Matriculation Examination.

40. Previous Examination for B.A. Degree.

41. Examination for a Degree in Arts.

#### ROYAL UNIVERSITY OF IRELAND :—

42. Matriculation Examination.

#### OXFORD AND CAMBRIDGE SCHOOLS' EXAMINATION BOARD.

43. Certificate to include the following subjects :—An adequate knowledge of English Grammar and Orthography, as shown in the course of the Examination, to the satisfaction of the Examiners, being held as conforming to the requirements of the Medical Council in regard to those subjects :—

(a) Arithmetic, including Vulgar and Decimal Fractions ;

(b) Algebra, including Simple Equations ;

(c) Geometry, including the first two books of Euclid ;



(d) Latin, including Translation and Grammar :

(e) Also one of these optional subjects :—

Greek, French, German.

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## II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE MEDICAL ACT.

### APOTHECARIES' SOCIETY OF LONDON.—

44. Examination in Arts.

### ROYAL COLLEGES OF PHYSICIANS AND SURGEONS OF EDINBURGH.—

45. Preliminary (combined) Examination in General Education.

### FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW:—

46. Preliminary Examination in General Education.

### ROYAL COLLEGE OF SURGEONS IN IRELAND:—

47. Preliminary Examination ; Certificate to include Mathematics.

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## III.—EXAMINING BODIES IN THE UNITED KINGDOM, NOT INCLUDED IN SCHEDULE (A) TO THE MEDICAL ACT (1858).

### COLLEGE OF PRECEPTORS:—

48. Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and either a Modern Language, or Greek, or Chemistry, or Botany, or Zoology, having been taken.

### QUEEN'S COLLEGE, BELFAST:—

49. Matriculation Examination.

### QUEEN'S COLLEGE, CORK.—

50. Matriculation Examination.

### QUEEN'S COLLEGE, GALWAY:—

51. Matriculation Examination.

### INTERMEDIATE EDUCATION BOARD OF IRELAND:—

52. Junior Grade Examination	} Certificate in each case to include all the subjects required.
53. Middle Grade Examination	
54. Senior Grade Examination	

### ST. DAVID'S COLLEGE, LAMPETER:—

55. Responsions Examination, to include all the subjects required.

EDUCATIONAL INSTITUTE OF SCOTLAND:—

56. Preliminary Medical Examination.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN:—

57. Preliminary and Minor Examinations (*pro tanto*).

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IV.—CERTAIN INDIAN, COLONIAL AND FOREIGN UNIVERSITIES  
AND COLLEGES.

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### REGULATIONS OF THE VARIOUS EXAMINING BODIES FOR THE DIPLOMA IN DENTAL SURGERY.

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#### PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Candidates are required to produce the following Certificates:—

1. Of being twenty-one years of age.
2. Of having been engaged during four years in the acquirement of professional knowledge.
3. Of having attended, at a school or schools recognised by this College, not less than one of each of the following courses of lectures, delivered by lecturers recognised by this College, namely; Anatomy, Physiology, Surgery, Medicine, Chemistry, and Materia Medica.
4. Of having attended a second winter course of lectures on Anatomy, or a course of not less than twenty lectures on the Anatomy of the Head and Neck, delivered by lecturers recognised by this College,
5. Of having performed dissections at a recognised school during not less than nine months.
6. Of having completed a course of chemical manipulation, under the superintendence of a teacher or lecturer recognised by this College.
7. Of having attended, at a recognised hospital or hospitals in the United Kingdom, the practice of Surgery and Clinical Lectures on Surgery during two Winter Sessions.

8. Of having attended, at a recognised school, two courses of lectures upon each of the following subjects, namely :—Dental Anatomy and Physiology (Human and Comparative), Dental Surgery, Dental Mechanics, and one course of lectures on Metallurgy, by lecturers recognised by this College.
9. Of having been engaged during a period of not less than three years in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent Practitioner.\* In the cases of qualified Surgeons, evidence of a period of not less than two, instead of three years, of such instruction will be sufficient.
10. Of having attended at a recognised Dental Hospital, or in the Dental Department of a recognised General Hospital, the practice of Dental Surgery during the period of two years.

NOTE.—All candidates who shall commence their professional education on or after the 22nd July, 1878, will, in addition to the certificates enumerated in the foregoing clauses, be required to produce a certificate of having, prior to such commencement, passed the preliminary examination in general knowledge for the Diploma of Member of the College, or an examination recognised as equivalent to that examination.

Candidates who were in practice as Dentists, or who had commenced their education as Dentists prior to September, 1859—the date of the charter—and who are unable to produce the certificates required by the foregoing Regulations, shall furnish the Board of Examiners with a Certificate of Moral and Professional Character, signed by two Members of this College.

Together with answers to the following inquiries :—

Name	Age	Professional Address.
If in practice as a Dentist, the date of the commencement thereof.		
Whether Member or Licentiate of any College of Physicians or Surgeons of the United Kingdom ; and if so, of what College.		
Whether Graduate of any University in the United Kingdom ;		

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\* Candidates may, however, pass eighteen months of the three years' instruction in Mechanical Dentistry *before* the date of their Registration as Students ; but four years must be given subsequent to the date of passing the Preliminary Examination, as set forth in clause 2, and also on page 368.

and if so, of what University ; and whether Graduate in Arts or Medicine.

The date or dates of any such Diploma, License or Degree.

Whether Member of any Learned or Scientific Society ; and if so, of what.

Whether his practice as a Dentist is carried on in connection with any other business ; and if so, with what business.

Whether, since 22nd July, 1876, he has employed Advertisements or Public Notices of any kind in connection with the practice of his Profession.

The particulars of Professional Education, Medical or Special.

The Board of Examiners will determine whether the evidence of character and education produced by a Candidate be such as to entitle him to examination.

#### PROFESSIONAL EXAMINATION.

The Examination is Written, Oral and Practical.

The Written Examination comprises General Anatomy and Physiology, and General Pathology and Surgery, with especial reference to the practice of the Dental Profession.

The Oral and Practical Examinations comprise the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, and by operations, &c.

Members of the College, in the Written Examination, will only have to answer those questions set by the Section of the Board consisting of persons skilled in Dental Surgery ; and in the Oral and Practical Examinations will be examined only by that Section.

A candidate whose qualifications shall be found insufficient will be referred back to his studies, and will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine.

Examinations will be held in May and November.

The Fee for the Diploma is Ten Guineas, over and above any stamp duty.

NOTE.—A ticket of admission to the Museum, to the Library, and to the College Lectures, will be presented to each candidate on his obtaining the diploma.



## SYLLABUS OF EXAMINATION.

In addition to the Special Examination by the Dental Section of the Board of Examiners, candidates are expected to answer questions in the written and *viva voce* Examinations on the following subjects :—

## ANATOMY AND PHYSIOLOGY.

The names of the Bones, and of their more important parts and their articulations.

The names and positions of the principal Arteries, Veins, and Nerves.

The form and relations of the Viscera of the Head, Chest, and Abdomen, and an elementary knowledge of their structure.

An elementary knowledge of the structure and properties of the principal tissues.

An elementary knowledge of the functions of Digestion, Absorption, Circulation, Respiration, Secretion, Motion, and Sensation.

The Surgical Anatomy and Physiology of the Organs of Mastication, Deglutition, Taste, and Articulation.

## PATHOLOGY AND SURGERY.

Inflammation and its consequences.

The healing of Wounds.

The methods of arresting Hæmorrhage.

The union of Fractures.

The signs of Asphyxia, and the treatment of threatened death from Anæsthetics.

The injuries and diseases of the Jaws, Mouth, Fauces, and adjacent parts.

EDWARD TRIMMER, *Secretary*.

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PROFESSIONAL EDUCATION REQUIRED BY THE  
ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

## PRELIMINARY EXAMINATION.

Candidates for the Dental Diploma must produce evidence of having attained the age of twenty-one years, and will require to produce a Certificate of having passed the Preliminary Examination in General Education required for the ordinary License in Surgery, or an examination equivalent to this, and recognised by

the General Medical Council,—except in the case of candidates who shall have commenced their professional education previous to the first day of August, 1878.

#### PROFESSIONAL EXAMINATION.

Candidates will also be required to produce Certificates of having been engaged during four years in the acquirement of professional knowledge, and of having been during that period, or at some time previous to their examination, engaged for not less than three years in the acquirement of a practical knowledge of Mechanical Dentistry with a registered practitioner.

#### LECTURES AND HOSPITAL ATTENDANCE.

The following Lectures and other Courses of Instruction must have been attended by candidates for the Dental Diploma, at a recognised Medical School or Schools ; and the number of Lectures in each of the general courses must correspond with those required for the Surgical Diploma of the College :—

Anatomy.—One Winter course.

Dissections and Demonstrations.—Nine months

or

Dissections ... } Nine months.

and

Anatomy of Head and Neck } One course of Twenty Lectures.

Physiology ... } One course of not less than  
Fifty Lectures.

Chemistry ... One Winter course.

Surgery ... One Winter course.

Medicine ... One Winter course,

Materia Medica ... One course of Three Months.

Practical Chemistry and }  
Metallurgy ... } One course of Three Months.

Clinical Instruction in Sur- } One course of Six Months,  
gery at a recognised Hos- } or  
pital. } Two courses of Three Months.

In addition to these, candidates will require to have attended the following Special Courses of Lectures and Instructions, in terms of the curriculum, and by teachers recognised by this College :—

Dental Anatomy and Physiology }  
Dental Surgery and Pathology } One course of each.  
Dental Mechanics ... }

Two years' attendance at a Dental Hospital or the Dental Department of a General Hospital recognised by the College.

Candidates who are Licentiates of this College, or who may be registered Medical Practitioners, will require to produce Certificates of Attendance on the special subjects only, and will be examined in these only for the Dental Diploma.

#### EXAMINATIONS.

The Dental examinations shall be both Written and Oral, and be conducted in the same manner as the ordinary Surgical Examinations. These Examinations shall consist of two separate sittings, and be held subsequent to each period of the Ordinary Examinations, on such days as the College may appoint. Candidates must apply to the Secretary of the College not later than one week preceding the day of examination, and must then produce all the required Certificates of having passed the Preliminary Examination, and of having attended the Lectures and other prescribed courses of instruction.

#### SUBJECTS OF EXAMINATION.

The ordinary subjects of Examination will be Anatomy, Physiology, Chemistry (including Metallurgy), Surgery, Medicine and Materia Medica; and the special subjects will be Dental Anatomy and Physiology, Dental Surgery and Pathology, and Dental Mechanics. Anatomy, Chemistry (with Metallurgy), and Physiology, will form the subjects of the first Examination; Surgery, Medicine, Materia Medica, and the special subjects, those of the second.

#### TITLE AND DIPLOMA.

Those candidates who pass this Examination shall be entitled to the designation of Licentiate in Dental Surgery of the Royal College of Surgeons of Edinburgh, and shall obtain the Dental Diploma of the Royal College. Each candidate, before receiving his Diploma, shall, in entering his name in the books of the College, sign the following declaration:—

I hereby promise faithfully to maintain and defend all the rights and privileges of the Royal College of Surgeons of Edinburgh, and to promote its interests to the utmost of my power. I promise, in the event of my admission as a

Dental Licentiate of that College, to refrain from advertising or employing any other unbecoming modes of attracting business, and I shall not allow my name to appear in connection with any one who does so. I also promise to obey all the laws of the said Royal College, made or to be made.

#### FEES, ETC.

The fee for the Dental Diploma shall be ten guineas. Each candidate, for the first examination, shall pay to the Treasurer of the College the sum of four guineas not later than eleven a.m. of the Saturday preceding the examination; and in the event of a candidate being unsuccessful, two guineas will be returned to him. Where the candidate is successful, the sum of four guineas will be considered as paid to account of the diploma. Each candidate for the second examination shall pay to the Treasurer of the College the sum of six guineas, not later than the Friday preceding the second examination; and in the event of his being unsuccessful, three guineas will be returned to him. No candidate will, if unsuccessful, be remitted for a shorter period than three months. These rules will apply to any subsequent rejection.

#### EXAMINATIONS SINE CURRICULO, UP TO DEC. 31st, 1888.

Candidates who were in practice before the first day of August, 1878, or those not in practice but who had commenced their apprenticeship as Dentists before the first day of August, 1875, and who are unable to furnish the Board of Examiners with the certificates of lectures and hospital attendance required by the foregoing regulations, shall fill in the schedule of application as follows:—

1. Full name, age and address of candidate.
2. Certificates of moral and professional character, signed by two registered Medical Practitioners.
3. The date of commencing practice or Apprenticeship as a Dentist, and whether, if in practice, such practice has been carried on in conjunction with any other business, and, if so, with what business.
4. Whether he has any Degree or Diploma in Medicine or



Surgery, and if so, from what College or University, or other body, and at what time it was obtained.

5. The particulars of professional education.

The President's Council shall, on such information being afforded them, determine whether or not the candidate may be admitted to examination for the Dental Diploma, and such examination shall, with the exception of the preliminary examination, and the exemptions in favour of Registered Medical Practitioners, as before explained, be passed on the same subjects and in the same manner as is required for other candidates, and will confer the same privileges.

The following will be the periods of examination for the year 1888-89 :—

I. PRELIMINARY EXAMINATIONS IN GENERAL EDUCATION.

These examinations will be held in October, 1888, April, July and October, 1889.

II. FIRST PROFESSIONAL EXAMINATIONS.

These examinations will be held in October, 1888, January, April, July and October, 1889.

III. SECOND PROFESSIONAL EXAMINATIONS.

These will take place after the conclusion of the first professional examinations, at each of the above-mentioned periods. They will generally be begun on the Thursday succeeding the day of the first examination, and in no case on an earlier day.

SYLLABUS OF EXAMINATIONS

In addition to a particular acquaintance with Dental Anatomy, Physiology and Surgery, candidates are expected to possess a competent knowledge of at least the following general subjects of examination :—

ANATOMY AND PHYSIOLOGY.

1. The Skeleton in general ; the anatomical characters and articulations of the Bones ; with the Muscles of the Inferior Maxilla and Upper and Lower Extremities.
2. Names and positions of the principal Blood-vessels and Nerves, and of the Viscera of the Chest and Abdomen.

3. General Anatomy of the Brain and Intercranial Nerves.
4. General knowledge of the functions of Circulation, Respiration and Sensation.
5. An Elementary knowledge of Histological Structures.

## CHEMISTRY.

1. The Laws of Combination.
2. Sources or preparation and chemical properties of Oxygen, Hydrogen, Nitrogen, Carbon, Sulphur, and Chlorine.
3. A general acquaintance with the Chemistry of Potass, Soda, Ammonia, Iron, Lead, Gold, Copper, Zinc, Arsenic, and Mercury.

## MEDICINE, SURGERY, AND MATERIA MEDICA.

1. The nature and treatment of Inflammation, Hæmorrhage Asphyxia, Syncope, Wounds and Fractures; along with an Elementary knowledge of Diseases and the practice of Medicine in general.
2. A general knowledge of the action of Narcotics, Emetics, Purgatives, Depressants, and Stimulants, with examples of the commoner substances used as each, and the modes of their prescription.

JOSEPH BELL, *Secretary.*

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### PROFESSIONAL EDUCATION REQUIRED BY THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The regulations of the Faculty of Glasgow do not materially differ from those of the Royal College of Surgeons of Edinburgh.

The Dental Examinations will be held in October, January, April and July.

The *Second Examination* will take place on the two days following the First Examination.

ALEXANDER DUNCAN, B.A., *Secretary.*

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### PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS IN IRELAND.

Every candidate for the License in Dentistry of the College shall produce evidence of having been registered by the General

Medical Council as a student in medicine. Certificates of study will not be recognised by the College if the date of commencement of the course to which the certificate refers is more than fifteen days prior to such registration.

Every Candidate for the License in Dentistry shall be required to pass a Preliminary Examination and three Professional Examinations.

#### PRELIMINARY EXAMINATION.

The regulations of the College which refer to the Preliminary Examination of the candidate for the Letters Testimonial shall apply to the candidate for the Dental License.

Candidates are strongly advised to pass in Physics at the Preliminary or Equivalent Examination.

#### PROFESSIONAL EXAMINATIONS.

The First and Second Professional Examinations shall be held in July and October of each year.

Should the Student fail to pass in July, he may present himself in October.

The Examination of each year must be passed before a new session can be entered on, but, in special cases, it shall be in the discretion of the Council of the College to permit the student, for what appears to them sufficient cause, to commence a new year of study, and subsequently present himself for a supplemental Examination.

#### FIRST PROFESSIONAL EXAMINATION.

The candidate is required, before admission to the First Professional Examination, to produce evidence of having been registered as a medical student by the General Medical Council, also to produce certificates of having subsequently attended—

Surgical department of a General Hospital, nine months.

Winter courses	{	Practical Anatomy, with Demonstrations and Dissections.
		Physiology.
		Surgery.
		Chemistry.

Summer courses	{	Practical Chemistry.
		Practical Physiology.
		Materia Medica.

The fee for this examination shall be £5 5s. Candidates who are rejected will be admitted to re-examination on paying an additional fee of £2 2s.

The subjects and order of this examination are identical with those of the Second Professional Examinations for the Letters Testimonial of the College.

#### SECOND PROFESSIONAL EXAMINATION.

The candidate is required, before admission to the Second Professional Examination, to produce evidence of having passed the First Professional Examination, also certificates of having subsequently attended.

Surgical department of a General Hospital, nine months.

Winter courses	{	Demonstrations and Dissections.
		Practical Anatomy.
		Surgery.
		Medicine.

The fee for this examination shall be £5 5s., and for re-examination, if rejected, £2 2s.

The subjects and order of this examination shall be identical with those of the Third Professional Examination for the Letters Testimonial of the College.

#### THIRD AND FINAL PROFESSIONAL EXAMINATION.

The Third Professional Examination shall be held in April, July, and October. The candidate is required, before admission to the Final Examination, to produce evidence—

- a. Of having passed the Second Professional Examination ;  
or of having obtained a diploma in Surgery recognised by the College.
- b. Of having attended, subsequent to registration by the General Medical Council, the following courses of Lectures recognised by the College :—

Dental Surgery and Pathology	} Of each two courses.
Dental Mechanics	
Dental Anatomy and Physiology	} One course.
Dental Metallurgy	

- c. Of having attended for two years the practice of a Dental Hospital recognised by the College.



- d.* Of having been engaged in acquiring a practical knowledge of Mechanical Dentistry, for the least two years, in a public Laboratory recognised by the College; or for at least three years under the instruction of a Registered Dentist. The candidate shall also submit a piece of mechanical work certified to be of his own making.

The candidate holding a diploma in Surgery recognised by the College shall be required to produce certificates of one course of each of the above special Dental Subjects, and of half the Hospital attendance and half the Laboratory work required from other Dental students.

As this remission has been made on the understanding that the Qualified Surgeon shall devote his whole time to the Dental work, the special Dental courses, Hospital attendances, and Laboratory work required from him, must all be taken out after the date of his diploma in Surgery.

#### FEES.

The fee for the Final Examination shall be, in the case of Licentiates in Surgery of the College, and for Dental Students, £7 7s. For re-examination, if rejected, £4 4s.

For candidates holding a Surgical diploma other than that of the Royal College of Surgeons in Ireland, £12 12s. For re-examination, if rejected, £6 6s.

#### SUBJECTS OF EXAMINATION.

Candidates shall be examined in—

1. Dental Surgery—Theoretical, Clinical, and Operative.
2. Dental Mechanics—Theoretical and Operative.
3. Dental Anatomy and Physiology.
4. Metallurgy and Physics.

#### ORDER OF EXAMINATION.

##### FIRST DAY (PRINTED QUESTIONS).

Two hours shall be allotted to this examination. Three questions each in Dental Surgery, Dental Mechanics, Dental Anatomy, Metallurgy, and Physics shall be given. One question at least must be answered on each subject.

Candidates who have already passed in Physics at the Preliminary or Equivalent Examination shall be exempt from this subject at the Final Examination.

## SECOND DAY (ORAL).

Each candidate shall be separately examined on each of the subjects of the first day.

## THIRD AND FOURTH DAYS.

(Operative Dental Surgery and Mechanical Dentistry).

On these days the candidate's knowledge of Clinical Dental Surgery and Practical Operative Dentistry, and of Clinical Dental Mechanics and Practical Mechanical work, shall be tested. Candidates shall be examined at Hospital, and in the Dental Laboratory, and shall be required to perform operations on the model, and to carry out such mechanical work as the examiner shall direct.

## REJECTED CANDIDATES.

No candidates for second or subsequent examinations shall be admitted thereto who has not satisfied his examiners at previous examinations ; but all candidates who have passed any examinations shall get credit for the same when presenting themselves upon a subsequent occasion.

## EXAMINATIONS SINE CURRICULO.

Candidates who were in practice before 1878, whose names are on the Dental Register, and who are unable to furnish the certificates required by the foregoing regulations, may be admitted to examination if they shall fill in the schedule of application as follows :—

1. The name, age, and address.
2. A certificate of his moral and professional character signed by two Registered Medical Practitioners and by two Registered Dentists.
3. The date of his commencing practice, and whether such practice has been carried on in conjunction with any other business, and if so, with what business ?
4. Any certificate he may have of general education, or degree in Arts or Medicine.
5. The particulars of professional education.

The schedule of application, containing these particulars, shall be sent to the Registrar of the College, at least three weeks before the date of the examination ; and the Council of the College shall then determine whether or not the candidate shall be admitted to examination for the Dental diploma. Such examination shall

comprise the same subjects, and be conducted in the same manner as is herein set forth in reference to the Second and the Final Professional Examinations.

#### FEES.

The Fee for this examination shall be £21 ; re-examination, if rejected, £10 10s.

#### DECLARATION TO BE TAKEN BY LICENTIATES.

The candidates entitled to receive the Dental diploma are required to attend upon such day as shall be notified to them, and to take a declaration.

They shall then sign the College roll, and shall receive their diplomas.

An enrolment fee of £1 1s. is payable to the Registrar of the College on the issue of the diploma.

These bye-laws shall come into effect from and after 1st day of August, 1884. But the Council of the College reserve the right of making such modifications, as may seem to them reasonable, in favour of students who shall have commenced their studies before that date.

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## REGULATIONS RELATING TO PROFESSIONAL EDUCATION AND EXAMINATIONS FOR THE M.R.C.S. & L.R.C.P.

### SECTION I.

#### PROFESSIONAL EDUCATION.

The M.R.C.S., or the L.R.C.P., cannot now be taken separately ; and any candidate who desires to obtain both the License of the Royal College of Physicians of London and the Diploma of Member of the Royal College of Surgeons of England is required to comply with the following Regulations, and to pass the Examinations hereinafter set forth. [See Section II.]

Every such candidate who shall commence Professional study on or after the First of October, 1884, will be required, at the times prescribed in Section II. for the respective Examinations, to produce satisfactory evidence :—

1. Of having been Registered as a Medical Student by the General Medical Council. [See Regulations of the General Medical Council, page 368, also to be obtained of the Registrar, 299, Oxford Street, London, W.]

NOTE A.—Professional Studies commenced before Registration, except in the cases of Chemistry and Chemical Physics, Materia Medica, and Pharmacy, will not be recognised.

2. Of having been engaged in Professional Studies at least forty-five months, during which not less than three Winter Sessions and two Summer Sessions shall have been passed at one or more of the medical Schools recognised by the two Colleges. One Winter Session and two Summer Sessions may be passed in one or more of the following ways :—
  - (a) Attending the practice of a Hospital Infirmary, or other Institution recognised as affording satisfactory opportunities for Professional Study ;
  - (b) Receiving Instruction as a Pupil of a legally qualified Practitioner holding such a public appointment, or having such opportunities of imparting a practical knowledge of Medicine, Surgery, or Midwifery, as shall be satisfactory to the two Colleges ;
  - (c) Attending Lectures on one or more of the required subjects of Professional Study at a recognised place of instruction.
3. Of having received instruction in the following subjects :—
  - (a) Chemistry, including Chemical Physics.
  - (b) Practical Chemistry.
  - (c) Materia Medica.
  - (d) Pharmacy.

NOTE B.—The instruction in Practical Pharmacy must be given by a registered Medical Practitioner, or by a member of the Pharmaceutical Society of Great Britain, or in a Public Hospital, Infirmary, or Dispensary.

4. Of having performed Dissections, at a recognised Medical School, during not less than twelve months.
5. Of having attended at a recognised Medical School :—
  - (a) A course of Lectures on Anatomy during not less than six months, or one Winter Session.
  - (b) A course of Lectures on General Anatomy and Physiology during not less than six months, or one Winter Session.



- (c) A separate Practical course of General Anatomy and Physiology during not less than three months.
- 6. Of having attended at a recognised Medical School :—
  - (a) A course of Lectures on Medicine during not less than six months, or one Winter Session.
  - (b) A course of Lectures on Surgery during not less than six months, or one Winter Session.
  - (c) A course of Lectures on Midwifery and Diseases peculiar to Women during not less than three months.

NOTE C.—A Certificate must also be produced of attendance on not less than Twenty Labours, which Certificate must be signed by one or more legally qualified practitioners.

- (d) Systematic Practical Instruction in Medicine, Surgery, and Midwifery, including :—
  - 1. The application of Anatomical knowledge to the investigation of Disease.
  - (2) The methods of examining various Organs and other Parts of the Body, in order to detect the evidence of Disease or the effects of Accidents.
  - 3. The employment of Instruments and Apparatus used in diagnosis or treatment.
  - 4. The examination of Diseased Structures, whether recent or in a Museum.
  - 5. The Chemical Examination of Morbid products.
  - 6. The performance of operations on the Dead Body.
  - 7. Post-Mortem Examinations.
- (e) A course of Lectures on Pathological Anatomy during not less than three months.
- (f) Demonstrations in the *post-mortem* room during the whole period of attendance on Clinical Lectures. [*See Clause 8.*]
- (g) A course of Lectures on Forensic Medicine during not less than three months.
- 7. Of having attended, at a recognised Hospital or Hospitals, the practice of Medicine and Surgery during Three Winter and Two Summer Sessions.

NOTE D.—No Metropolitan Hospital is recognised which contains less than 150, and no Provincial or

Colonial Hospital which contains less than 100 Patients.

A three months' course of Clinical Instruction in the Wards of a recognised Lunatic Hospital or Asylum may be substituted for the same period of attendance in the Medical wards of a General Hospital.

8. Of having attended at a recognised Hospital or Hospitals during nine months Clinical Lectures on Medicine, and during nine months Clinical Lectures on Surgery, and of having been engaged during a period of Three Months in the Clinical Study of Diseases peculiar to Women.

NOTE E.—These Clinical Lectures must be attended after the candidate has passed the Second Examination.

9. Of having discharged, after he has passed the second Examination, the duties of a Medical Clinical Clerk, during Six Months, and of a Surgical Dresser during other Six Months.

NOTE F.—These duties may be discharged at a General Hospital, Infirmary, or Dispensary, or Parochial or Union Infirmary, recognised for this purpose, or in such other similar manner as shall, in the opinion of the two Colleges, afford sufficient opportunity for the acquirement of practical knowledge.

10. Of having received Instruction in the practice of Vaccination.

NOTE G.—The Certificate must be such as will qualify its holder to contract as a Public Vaccinator under the Regulations, at the time in force, of the Local Government Board.

*Students are required to attend Examinations which are held in the several Classes.*

N.B.—Exemption from any of the foregoing Regulations can only be granted by the Committee of Management.

## SECTION II.

### PROFESSIONAL EXAMINATIONS.

There are three Professional Examinations, called the First Examination, the Second Examination, and the Third or Final

Examination, each being partly written, partly oral, and partly practical.

#### THE FIRST EXAMINATION.

The subjects of the First Examination are :—

Chemistry and Chemical Physics.

Materia Medica and Pharmacy.

Elementary Anatomy and Elementary Physiology.

A candidate may take this Examination in three parts at different times, or he may present himself for the whole at one time.

A candidate will be admitted to the Examination on Chemistry, including Chemical Physics, Materia Medica, and Pharmacy, on producing evidence of having been registered as a Medical Student by the General Medical Council, and of having complied with the Regulations prescribed in Section I., Paragraph II., Clause 3, *or he may take Materia Medica and Pharmacy as part of the Second Examination*; but he will not be admitted to the Examination on Elementary Anatomy, and Elementary Physiology, earlier than the end of his first Winter Session at a Medical School.

The Fees for admission to the First Examination are £10 10s.

#### THE SECOND EXAMINATION.

The subjects of the Second Examination are :—

Anatomy.

Physiology.

A candidate may present himself for Examination in either of these Subjects or Parts separately, or in both at one time.

A candidate will be admitted to the Second Examination after the lapse of not less than six months from the date of his passing the First Examination, on producing evidence of having completed, subsequently to registration as a Medical Student, eighteen months of professional Study at a recognised Medical School or Schools, and of having complied with the regulations prescribed in Section I., Clauses 4 and 5.

The Fees for admission to the Second Examination are £10 10s.

#### THE THIRD OR FINAL EXAMINATION.

The subjects of the Final Examination are :—

Medicine, including Therapeutics, Medical Anatomy, and Pathology.

Surgery, including Surgical Anatomy and Pathology.  
Midwifery, and Diseases peculiar to women.

*Questions on Forensic Medicine and Public Health will be included in the Third or Final Examination.*

A candidate may present himself for examination in these Three Subjects or Parts separately or at one part.

A candidate will be admitted to the Third or Final Examination on producing evidence—

1. Of being Twenty-one Years of age.
2. Of having passed the Second Examination.
3. Of having studied Medicine, Surgery, and Midwifery, in accordance with the Regulations prescribed in Section I., Clauses 2 and 6 to 10.

The Colleges do not admit to either Part of the Third or Final Examination any candidate (not exempt from Registration) whose name has not been entered in the Medical Students' Register at least forty-five months, nor till the expiration of two years after his having passed the Second Examination.

The Fees for admission to the Third or Final Examination are £15 15s.

Every candidate who shall have passed the Third or Final Examination is, subject to the Bye-laws of the two Colleges, entitled to receive—

The License of the Royal College of Physicians of London,  
and

The Diploma of Member of the Royal College of Surgeons  
of England.

*Forms of the required Certificates may be obtained of the Secretary, Mr. F. G. Hallett, of the Examining Board in England, Examination Hall, Victoria Embankment, London, W.C.*

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### SPECIAL DENTAL SCHOOLS.

THE DENTAL HOSPITAL OF LONDON, LEICESTER  
SQUARE.

DENTAL ANATOMY AND PHYSIOLOGY.

By Arthur Underwood, M.R.C.S., L.D.S.Eng.—On Wednesdays and Saturdays, at 8 a.m., during the Summer Session.



## DENTAL SURGERY AND PATHOLOGY.

On Tuesdays and Fridays, at 8 a.m., during the Summer Session.

## DENTAL MECHANICS.

By Joseph Walker, M.D., M.R.C.S., L.D.S.Eng.—On Wednesdays, at 5 p.m., during the first half of the Winter Session.

## METALLURGY.

By Prof. A. K. Huntington—On Tuesdays, at 12 o'clock, during the first half of the Winter Session.

Fees for two years' Hospital Practice and the Lectures, £31 10s.

MORTON SMALE, *Dean*.

NATIONAL DENTAL HOSPITAL AND COLLEGE,  
GREAT PORTLAND STREET.

## DENTAL ANATOMY AND PHYSIOLOGY.

By Thomas Gaddes, L.D.S.Eng. and Edin.—On Tuesdays and Thursdays, at 6 p.m., during October, November and December.

## OPERATIVE DENTAL SURGERY.

By George Cunningham, B.A., D.M.D., L.D.S.Eng.—On Mondays, at 6.30 p.m., during October, November and December.

## DENTAL MATERIA MEDICA.

By Charles Glassington, M.R.C.S., L.D.S.Eng.—On Tuesdays, at 7.30 p.m., during October, November and December.

## DENTAL MECHANICS.

By Harry Rose, L.D.S.Eng.—On Mondays, at 7 p.m., during January, February and March.

## DEMONSTRATIONS IN DENTAL MECHANICS.

By W. R. Humby, L.D.S.Eng.—On Wednesdays, at 7 p.m., during January, February and March.

## DENTAL METALLURGY.

By W. Lapraik, F.I.C., F.C.S.—On Tuesdays, at 7.30 p.m., during January, February and March.

## DENTAL SURGERY AND PATHOLOGY.

By Willoughby Weiss, L.D.S.Eng.—On Mondays and Thursdays, at 6. p.m., during May, June and July.

## THE ELEMENTS OF HISTOLOGY.

By James Maughan, M.D., L.R.C.P., M.R.C.S. On Mondays and Thursdays, at 5 p.m., during May, June and July.

Fees for two years' Hospital Practice and all the Lectures, £25 4s. Perpetual, £31 10s.

THOMAS GADDES, *Dean*.

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## OWEN'S COLLEGE AND THE VICTORIA DENTAL HOSPITAL, MANCHESTER.

Instruction adapted to the requirements of students preparing for the Dental Diploma of the Royal College of Surgeons of England and other licensing bodies is now given by Owen's College, in conjunction with the Victoria Dental Hospital, Manchester.

The Lecturers on Dental subjects are :—

## DENTAL ANATOMY AND PHYSIOLOGY.

By Andrew M. Paterson, M.D., M.R.C.S.—On Tuesdays, at 11 a.m., and Fridays, at 12 noon, during the Summer Session.

## DENTAL SURGERY.

On Mondays and Fridays, at 4.30, during the Summer Session.

## DENTAL METALLURGY.

By C. H. Burghardt, Ph.D.—On Thursdays, at 2.30 p.m., during the Summer Session.

## DENTAL MECHANICS.

By Thomas Tanner, L.D.S.Eng.—On Thursdays, at 4 p.m., during the Winter Session.

The fee for two years' Dental Hospital Practice is £12 12s.

The cost of the necessary courses for qualification, together with the Infirmary and the Dental Hospital Practice, £73 2s.

HENRY PLANCK, *Dean of Dental Hospital*.

H. W. HOLDER, *Registrar, Owen's College*.

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## QUEEN'S COLLEGE, BIRMINGHAM, AND BIRMINGHAM DENTAL HOSPITAL.

The teaching of Dentistry is now undertaken by the Queen's College, acting in association with the Birmingham Dental Hospital and the Birmingham Clinical Board, so that Students may fully qualify themselves for the Dental Diploma of the Royal Colleges.

The Dental Hospital is centrally situated, near the College, and is open daily (Sundays excepted). The number of patients treated in 1886 was 11, 700.

### DENTAL ANATOMY AND PHYSIOLOGY.

By John Humphreys, L.D.S.I.—On Thursdays, at 5 p.m., during the Winter Session.

### DENTAL SURGERY AND PATHOLOGY.

By Charles Sims, L.D.S.Eng.—On Fridays, at 5 p.m., during the Winter Session.

### DENTAL MECHANICS.

By W. T. Elliot, L.D.S.Edin. & I., F.C.S.—On Wednesdays, at 5 p.m., during the Summer Session.

### DENTAL METALLURGY.

By W. Tilden, F.R.S., D.Sc.—On Tuesdays, at 2.30 p.m., from October till Christmas.

Fee for two years' Hospital Practice, Fourteen Guineas.

A Composition Fee of Sixty Guineas, payable in one sum, or in two sums, viz. : Forty Guineas at the beginning of the First year, and Twenty Guineas at the beginning of the second year of studentship, admits to the full Curriculum required for the Dental Diploma (inclusive of the necessary Hospital Practice). Any additional attendance will be charged for according to the general conditions.

JOHN HUMPHREYS, *Sec. to the Dental Board.*

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## UNIVERSITY COLLEGE, DOVER STREET, LIVERPOOL, AND DENTAL HOSPITAL, MOUNT PLEASANT.

The entire Curriculum can be completed at these two Schools.

DENTAL ANATOMY AND PHYSIOLOGY.—By F. T. Paul, F.R.C.S.

DENTAL SURGERY.—By E. J. M. Phillips, M.R.C.S., L.D.S.Eng.

DENTAL MECHANICS.—By E. A. Councell, L.D.S.Eng.

DENTAL METALLURGY.—By J. Royston, L.D.S.Eng.

FEES FOR DENTAL HOSPITAL PRACTICE.—Five Guineas per annum for all Students who are not taking out the full Curriculum ; Four Guineas for full Students at these schools.

COMPOSITION FEE.—A payment of Fifty Guineas on entrance, or in two equal instalments (one-half on entrance and the remainder within twelve months), entitles the Student to attendance on all Lectures and Demonstrations (Medical and Special) required for the License of the Royal College of Surgeons of England. The fees for the Practice of the two Hospitals amount to £23 2s. The total expenditure for the whole Curriculum is £75 12s.

F. T. PAUL, *Vice-Dean*.

## DENTAL DISPENSARY AND SCHOOL, OCTAGON, PLYMOUTH.

DENTAL ANATOMY.—By F. H. Balkwill, L.D.S.Eng.

DENTAL PHYSIOLOGY.—By C. Spence Bate, F.R.S., &c.

DENTAL MECHANICS.—By W. V. Moore, L.D.S.Eng.

The Fee for Lectures and Dispensary Practice is £23 2s.

E. G. BENNETT, *Hon. Sec.*

## DENTAL HOSPITAL OF EXETER, BEDFORD CIRCUS.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma. Pupils of any Member of the Staff, or other Registered Practitioner (being a Life or Annual Governor), are permitted to attend the practice of the Hospital, subject to the approval of the Medical Sub-Committee, on payment of Five Guineas annually to the funds of the Institution.

W. MAY, *Hon. Secretary*.

## EDINBURGH DENTAL HOSPITAL AND SCHOOL, CHAMBERS STREET.

DENTAL ANATOMY AND PHYSIOLOGY.

By Andrew Wilson, L.D.S.Edin.—On Tuesdays and Fridays, at 8 p.m., commencing in November. The course will consist of Twenty-four Lectures.



## DENTAL SURGERY AND PATHOLOGY.

By George W. Watson, L.D.S.Edin.—On Tuesdays and Fridays, at 8 a.m. during the Summer Session. The course will consist of Twenty Lectures.

## MECHANICAL DENTISTRY.

By W. Bowman Macleod, L.D.S.Edin.—On Wednesdays, at 8 p.m., commencing in November.

## PRACTICAL MECHANICS.

Assistant Demonstrator.—J. Stewart Durward, L.D.S.Edin. The Demonstrations will be spread over the two years of Hospital Practice, and will be given as occasion serves.

Fees : For Hospital Practice, £15 15s.; Lectures, £9 15s.; total, £25 10s. This does not include the fee of £2 4s. for second courses of Lectures required by the Royal College of Surgeons of England.

W. BOWMAN MACLEOD, *Dean.*

## GLASGOW DENTAL HOSPITAL AND SCHOOL. 56, GEORGE SQUARE.

## DENTAL ANATOMY AND PHYSIOLOGY.

By J. C. Woodburn, M.D., L.D.S.Glas.—On Wednesdays and Saturdays at 8 a.m., during Summer Session.

## DENTAL SURGERY AND PATHOLOGY.

By J. R. Brownlie, L.D.S.Eng.—On Tuesdays and Fridays, at 8 a.m. during Summer Session.

## DENTAL METALLURGY.

By Rees Price, L.D.S.Eng.—On Wednesday Evenings, at 7 p.m., during Winter Session.

## MECHANICAL DENTISTRY.

By W. S. Woodburn, L.D.S.Glas.—On Tuesdays, at 7 p.m., during Winter Session.

Fee for two years' Hospital Practice is £12 12s.; for the four courses of Dental Lectures, £3 3s. each.

TOTAL FEE for Special Lectures and Hospital Practice required by the Curriculum is £23 2s., of which £15 15s. may be paid on entering, and £7 7s. at the beginning of the second year.

J. R. BROWNIE, *Dean.*

## DENTAL HOSPITAL OF IRELAND, YORK STREET, DUBLIN.

### SUMMER SESSION.

DENTAL ANATOMY AND PHYSIOLOGY.—By Daniel Corbett, Jun.,  
A.B., F.R.C.S.I.

DENTAL SURGERY AND PATHOLOGY.—By A. W. W. Baker,  
M.B., Ch.M.

### WINTER SESSION.

DENTAL MECHANICS.—By W. Booth Pearsall, F.R.C.S.I.,  
D.M.D.

METALLURGY.—By Charles Cameron, M.D., F.R.C.S.I.

In the Mechanical Laboratory each Student is allotted his own  
bench, where practical instruction is carried out.

Total Fees £31 10s.

THEODORE STACK, M.D., *Dean*.

## GENERAL MEDICAL SCHOOLS.

### BARTHOLOMEW'S HOSPITAL, SMITHFIELD, E.C.

Fee for General Subjects for Students of Dental Surgery :—First  
Winter, 31½ guineas; First Summer, 31½ guineas; or a single  
payment of 63 guineas.

Dr. NORMAN MOORE, *Warden*.

### CHARING CROSS HOSPITAL, W.C.

The Composition Fee for Dental Students is £42 2s. This  
may be paid in two instalments of £22 2s. and £20, at the  
commencement of each Winter Session respectively.

Dr. J. MITHCELL BRUCE, *Dean*.

### GUY'S HOSPITAL, BOROUGH, S.E.

Fee for attendance on the Hospital Practice and Lectures  
required for the Dental Diploma of the College of Surgeons  
63 guineas, or in two annual instalments of 40 guineas and  
23 guineas. The above fee does not include £1 10s. for Practical  
Chemistry.

Dr. F. TAYLOR, *Dean*.

### KING'S COLLEGE, STRAND, W.C.

No special arrangements are made for Dental Students.

Prof. CURNOW, *Dean*.

## LONDON HOSPITAL, MILE END, E.

Composite Fee for Dental Students:—Hospital Practice and Lectures, £42. This does not include the Fee of £2 2s. for Practical Chemistry.

MUNROE SCOTT, *Warden*.

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## MIDDLESEX HOSPITAL, BERNERS STREET, W.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite Courses of Lectures and Hospital Practice on payment of a fee of 40 guineas, in one sum on entrance, or by instalments of £30 on entrance and £15 at the beginning of the second Winter Session.

A. PEARCE GOULD, *Dean*.

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## ST. GEORGE'S HOSPITAL, GROSVENOR PLACE, S.W.

Fee for General Subjects required for the Diploma in Dental Surgery, including Practical Chemistry, £55; payable in two instalments: First year, £30; Second year, £25.

Dr. WADHAM, *Dean*.

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## ST. MARY'S HOSPITAL, PADDINGTON, W.

Entrance Fee to the General Hospital Practice and Lectures required for the examination in Dental Surgery at the Royal College of Surgeons, England, £55; payable in two instalments: First year, £30; Second year, £25.

GEORGE P. FIELD, *Dean*.

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## ST. THOMAS'S HOSPITAL, ALBERT EMBANKMENT, S.E.

The Fee for attendance on the General Subjects required of Students in Dental Surgery is, for the two years, £55; or by instalments, £50 for the first year, and £10 for the second year.

G. RENDLE, *Secretary*.

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## UNIVERSITY COLLEGE, GOWER STREET, W.C.

No special arrangements are made for Dental Students.

Prof. BERKELEY HILL, *Dean*.

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## WESTMINSTER HOSPITAL, BROAD SANCTUARY, S.W.

The Fees for the General Surgical Practice and Lectures required for the Dental Diploma of the Royal College of Surgeons may be paid in one or two ways, viz.:—1. In one payment on entrance, £50. 2. In two payments of £32 10s. and £20, to be made respectively at the commencement of each academic year. These payments include the Library Fee, and entitle the Student to attendance on the Tutorial Classes.

Dr. H. DONKIN, *Dean*.

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SCHOOL OF MEDICINE, SURGEONS' HALL,  
EDINBURGH.

The Fees for the General Subjects (including practice at the Royal Infirmary) required of Dental Students, according to the curriculum of the Royal College of Surgeons of Edinburgh, amount to £38 10s.

STEVENSON MACADAM, *Secretary*.

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## OWEN'S COLLEGE, MANCHESTER.

*See page 393.*

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## QUEEN'S COLLEGE, BIRMINGHAM.

*See page 394.*

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## UNIVERSITY COLLEGE, LIVERPOOL.

*See page 394.*

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## ANDERSON'S COLLEGE, GLASGOW.

The Fees for the General Subjects required of Dental Students, as prescribed by the curriculum of the Faculty of Physicians and Surgeons of Glasgow, amount to £25 14s. 6d. And the Fees at the Dental School for the special portion of the curriculum, including £12 12s. for the Dental Hospital Practice, are £23 2s.—total, £48 16s. 6d.

Dr. A. M. BUCHANAN, *Dean*.

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GLASGOW ROYAL INFIRMARY AND SCHOOL OF  
MEDICINE.

The Fees for the General Subjects amount to about £27 6s.

Dr. THOMAS, *Superintendent*.

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## SOME AFFECTIONS OF THE GUMS.

(Being a paper read before the Students' Society of the National Dental Hospital,  
Great Portland Street, W.)

By FRANK LANKESTER, L.R.C.P., M.R.C.S., L.D.S.Eng.,  
House Surgeon to the Hospital.

(Concluded from page 330.)

WE will now pass on to consider some of the *Constitutional* affections, and will take, first, that somewhat rare affection known as *Purpura hæmorrhagica*, in which disease the gums are more or less affected. It requires medical treatment, so I will not do more than mention it here. It occurs chiefly in the young and debilitated, and is characterised by extravasations of blood in the form of red points or *patechiæ* beneath the skin and mucous membranes, including the tongue, lips and gums. These resemble somewhat the small extravasations of blood that one not infrequently sees after having had the skin pinched unpleasantly hard, as with a pair of pliers, &c. There is always a tendency to hæmorrhage from all the mucous surfaces of the body, and it is only its rare occurrence that makes the disease comparatively unimportant. It may prove serious from the persistence of the hæmorrhages and the difficulty of arresting the same.

Another disease now happily also rare is *True Scurvy*, in which also we find extravasations beneath the gums. At first, merely the edges of the gums become somewhat swollen; the condition increases and lobulated masses form and rise up around and between the teeth, so that the latter may even be hidden. The gums get very spongy, insensitive, and of a blotchy deep red or livid colour, and they are very apt to bleed; indeed, in severe cases blood oozes continually from the gums. Ulceration and sloughing may supervene, and lay bare the necks of the teeth. The latter may get loose and fall out. The breath is generally very fetid and there is also a liability to submucous hæmorrhages. It occurs chiefly in navvies who live badly and take but little vegetable food. The *treatment* belongs to the general practitioner, and consists first in remedying the cause, whilst locally antiseptic and astringent mouthwashes will help the swollen state of the gums to quickly subside.

There is another condition of the gums known as *False Scurvy*, which is frequently met with in persons who neglect to clean their teeth, and are in feeble health. Salter describes it as consisting

essentially of a vascular dilation of the papillary and other capillaries, with a general thickening of the gum itself. It is a condition that can soon be remedied by improving the health and the use of a toothbrush with astringent mouth-washes to get the mouth and teeth clean and sweet. The gums will then soon resume their normal appearance.

*Addison's Disease* we will next briefly consider. It is a comparatively rare disease and is characterised by various nervous and dyspeptic symptoms, together with an ever-increasing debility and a most remarkable pigmentation or bronzing of the skin and mucous membranes. The skin, especially on exposed surfaces, assumes a deep brown mulatto tint, whilst on the tongue, gums and buccal mucous membrane there are found irregular patches of pigmentations of a dark brown or blackish colour, and which are quite characteristic of the disease, and could not well escape the notice of anyone examining the mouth. It occurs chiefly in males between ten and fifty years of age, and it always ends fatally, and commonly within a year. The treatment is purely palliative. I merely mention the disease here to-night as a rare abnormal condition of the gums, as a curiosity, so to speak.

I have mentioned four metallic poisons that exert an influence on the gums. We will take *Mercurial Poisoning* first. Mercury enters the system very readily, both by the stomach, skin and the lungs. It is taken very largely as a medicine, and is much used in various arts and manufactures, such as looking glasses, &c., &c. Hence we not infrequently meet with cases of mercurialism, *i.e.*, mercurial poisoning. One of the earliest indications of this is its effect on the gums, which generally give the first token in the form of a red line running along their margins; this is soon followed by much tenderness, swelling and pulpy thickening of a dark red colour first appearing around the incisor teeth. The gums finally retract from the teeth, the tongue becomes swollen and furred and the breath foetid. There is, too, a metallic taste present in the mouth. Besides this there is more or less profuse salivation, and the glands themselves become swollen and painful. If the inflammation goes on ulceration may supervene and large portions of the gums and cheeks may thus be destroyed. The teeth will become loose and fall out, and the maxillæ even carious. The *treatment* belongs to the surgeon or physician. The administration of the mercury should be discontinued for a time. Locally astringent mouthwashes are useful, whilst internally tonics should be given.

Where you wish to get the mercury quickly out of the system, iodide of potassium will be found the most useful drug, though it often produces increased salivation at first. We should not forget that when the patient is kept too long under its influence, very serious nervous and other affections may result, especially the so-called metallic *tremor* that affects all the muscles of the body. In some persons the effect of the drug is produced much more quickly than in others, and it has an especially debilitating effect on persons already exhausted by disease. Children under two years of age are rarely if ever salivated, but we must remember a peculiar malformation of the permanent teeth which Mr. Hutchinson has pointed out as being due to the incautious use of grey and other teething powders. The defect of development is said to be due to the stomatitis that is caused by the mercury, leading thereby, secondarily, to inflammation of the developing enamel organs. If for no other reason than this we ought to be familiar with the ill effects of mercurialism. As a query by the way, Ringer remarks that there are those who cannot take even the smallest doses of mercury without it causing toothache. Is this independent of caries? Perhaps some gentleman may be able to confirm this statement, which I thought of sufficient interest to permit of its being mentioned here.

We must now pass on to the consideration of *Chronic Lead Poisoning* so far as it affects the gums. It is a condition that one might meet with occasionally and perhaps quite accidentally in private practice and it is well that we should be familiar with its appearance. In *plumbism* we get the "blue line on the gums." This was first described by Dr. Burton, and is due to the action of sulphuretted hydrogen on the lead; the latter having been previously deposited in the substance of the gums, "black" sulphide of lead is formed, hence the discoloration. We have the development, then, of a narrow bluish or violet line along the free margins of the gums wherever the latter come into contact with the teeth. The sulphuretted hydrogen is formed by the decomposing matter accumulating around the necks of the teeth. Where there are no teeth there will be no place for the tartar or food to collect, and hence there will be no sulphuretted hydrogen, and therefore, also, no "blue line" formed. It appears first and is always most marked around the incisor teeth, especially the interdental portions, and this is particularly the case when the teeth are not kept clean. It may extend to the whole of the gums and even to the cheeks. The gums themselves are frequently retracted thereby, causing the teeth to appear

elongated ; the latter are sometimes discoloured, but whether this is in any way due to the lead or not I am uncertain. When present, as it almost always is, it forms an infallible diagnostic sign of the presence of lead in the system ; it is, however, occasionally absent, or at least very faintly marked, when the teeth are kept scrupulously clean. In rare cases it has been developed in the course of a few hours by two or three medicinal doses of lead. It is, of course, mostly found in painters, plumbers, &c., and those who are being continually brought into contact with it ; and such patients may yet be free from all other symptoms of plumbism. Where there are no teeth it may be quite absent. When we remember the many very serious digestive and nervous paralytic troubles that arise from chronic lead poisoning and the very many different ways in which lead may be quite ignorantly and accidentally taken into the system, it is, I think, most advisable and indeed highly important, so far as the patient is concerned, that we should very carefully inquire into all cases in which, from the condition of the gums, there is the slightest suspicion that the patient is the subject of plumbism. If our inquiries as to his general health, habits, &c., only tend to confirm our suspicion, we should then most certainly warn our patient as to his possible condition and urge him to obtain medical advice on the point. I only lately came across such a case at this hospital. I regret to say I cannot show you the patient to-night. The blue line along the gums was very well marked and the teeth were in a dirty condition generally. On inquiry he told me he was a gas-fitter, &c.

There are two other metals which affect the gums in a somewhat similar manner, but their rarity makes them unimportant, and I will not detain you long in describing them. The first I allude to is silver, which metal may be introduced into the system of those working in silver mines, or those who have been taking the nitrate of silver medicinally for some length of time. It leads gradually to a permanent discolouration of the skin, which becomes of a deep uniform leaden hue, and we frequently find that this is preceded by a dark brown line on the gums. The latter, therefore, is of some value to the physician, as it indicates the necessity of stopping the administration of the drug before the *skin* becomes permanently stained. This could hardly be confounded with lead, for some definite history will be obtainable of the introduction of silver into the system in some form or other. The other metal is *Copper*. In copper poisoning a greenish line appears along the gums.



In persons of a *Scrofulous* habit, we may often notice a red line running along the margins of the gums. This, too, may be frequently seen in debilitated and other conditions. Salter relates a most interesting case of a very chronic and extensive ulceration of the gums and palate. The surface was irregular and granulating, the ulceration being quite superficial. The teeth were loose, and there was no tendency for the affection to heal. The patient's appearance and history at once gave the clue to the cause of this particular diseased condition. His family had shown marked indications of scrofula, and he himself was the very embodiment of it. He was sixteen years of age, and at time of applying for advice the patient was suffering from a scrofulous ulcer on the arm, whilst the arms and legs were covered with scars the result of previous ulcers. It was a most typical example of a constitutional affection, manifesting itself locally in the form of an ulceration within the mouth. About two weeks ago, one of our members sent a case up to this hospital to obtain the surgeon's opinion and advice in the matter. I saw the case with Mr. W. Weiss. The patient was about twenty years of age, and gave a very strong family history of phthisis. She was evidently of a strumous habit herself, there being scars on the neck and obstruction of the nasal ducts, &c., besides a general debilitated condition. About ten months previously, patient said she first noticed a few white and red spots on the gum, situated over the upper left lateral root. The condition of gum has been very gradually spreading since then. The gums were very apt to bleed. On examining the gums, there was a small area over the upper incisor roots, which presented a very spongy and swollen condition, was of loose texture, and was covered with small papillæ. Tenderness and increased vascularity were well marked, the slightest touch leading to rather free oozing of blood. Along their margins was a narrow red line, whilst towards the sulcus they were of a pale colour. The teeth were beautifully white and healthy, and quite clean. The palate, also, was normal. There was a continuous slight discharge, and on pressure pus oozed up near the sulcus. Here a fine probe could be passed down on to a small spot of bare bone. We came to the conclusion that it was probably a case of caries of the alveolus occurring in a strumous subject, and that the condition of the gum was secondary to it and caused by the irritation of the constant discharge, &c., from the diseased bone beneath it. I recommended her to syringe it frequently with boracic acid lotion, and to take Easton's syrup internally, and endeavour to

improve her general health as much as possible. She promised to let me know how she progressed, but I have not yet heard from her.

I much regret that time fails me to say anything about the various forms of stomatitis that are of such frequent occurrence and that arise from so many different causes. The syphilitic are specially worthy of our most careful consideration and attention. Quite apart from their frequency they are of very considerable importance, and this is especially the case when present in the mouths of children during the period of development of the permanent teeth. I will only just mention a case of *Ulcerative Stomatitis* that I had under treatment about ten days ago, and from which I afterwards took this rough model which I now pass round. It shows very well the great destruction of gum that has occurred all along the margins, so that the necks of the teeth are laid bare for a considerable distance. Patient was a boy of about five years of age. Three weeks ago he had an attack of measles, and during the last eight or ten days the mouth has been very sore and inflamed, the gums bleeding on the slightest touch, whilst the breath has been very fœtid. On examining the mouth there was a red line running all along the gum margins; the necks of the teeth were bare and bathed in pus. There was a great destruction of tissue, and the gums generally were much swollen and inflamed, bleeding freely on touching them. I ordered the child to take six grains of chlorate potash internally three times a day, and to rinse the mouth out frequently with a gargle of the same salt, to which a little Condly was to be added. I saw him again four days later, when all inflammation had entirely disappeared, the mouth was nice and clean and the breath sweet; in fact, the patient was well and the mouth normal, excepting the destruction of tissue that had taken place.

I must now very humbly apologise for having detained you so long, but the subject which we have been considering covers a very much wider area than I at first thought it did; as it is I have not said a word about some of the most important affections. My chief object has been to bring under your notice those affections especially which are of some diagnostic value and importance, and I should have done better had I confined myself more strictly to this object. But I have simply not had time to get a real grasp of the subject, much less to arrange and put it in a paper in a concise and interesting form. I have, however, done my best in this matter during the short interval since we last met, and to-night I am sure you have done your best to give me an attentive and most patient hearing, for which I am extremely grateful to you all.

## Editorial.

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### IMPLANTATION OF TEETH.

AT the Dublin meeting of the British Dental Association, held on the 23rd, 24th and 25th ult., Dr. G. Cunningham brought forward the subject of Implantation of Teeth. An upper bicuspid, extracted from the jaw of a female, was implanted into an artificial socket excavated in the jaw of a young practitioner. The operation attracted the attention of a large number of members. At the conclusion of the reading of an abstract of a paper which Dr. Cunningham had prepared, the President spoke in high encomiums, saying he was unable to command language sufficient to express the feelings he entertained for the communication made to them by Dr. Cunningham.

The discussion at the meeting, as well as among members generally, was rather away from than incident to the present aspect of the question. Instead of dealing with its scientific bearings, theories and possibilities, even of a criminal nature, were aired and indulged in. That may have been so because of the paucity of scientific knowledge of the subject. But the main aim of the dissertation was to sift and arrange what information we possess, to acquire further data, and thus aid in eventually placing the operation in its true position in the Science of Surgery.

At present the operation is purely in an experimental stage. Much of what has been written upon it is of little value, because of the lax manner in which details have been attended to and expressed. There have been failures and successes—so far as time as yet enables us to judge. What the factors were which resulted in failure is a problem for investigation in future cases. Coincident, if not antecedent, to that inquiry we must have information upon the physiological and structural changes that take place, just as we know with regard to the repair of fractured bone. All that involves experiments varied in character, and very carefully conducted. Because of the absence of information on the

physiological, structural and pathological actions which ensue, the operation is, as yet, empirical. Hitherto, experiments have been conducted upon human beings; and the anomalous restrictions of the Vivisection Act and the enthusiasm of its votaries permit our fellow-creatures to subject themselves to experiments for the cause of Science and the good of mankind, but they do not permit the use of a dog.

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### GOSSIP.

THE investigations of the physical features of the surface of the planet Mars seem to be beset with difficulties, so changeable are the appearances presented to observers night by night. M. Perrotin says that the "sea" which so recently covered the district of Libya has again retreated for the most part. Of the canals, of which four have been noticed by him, three of them are double. They start from the seas of the southern hemisphere, near the equator, and extend in a nearly meridional course right up to the north polar ice cap. These appearances make them more puzzling than ever, and seem to dispose of the new theory of Fizeau, that they are analogues of the rifts in telluric glaciers; also of the terrestrial theory of Proctor, that they are rivers seen clearly or partially veiled by local mists.

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PROFESSOR JOHN RHYS says: The god of Druidism was the Aryan Zeus in Celtic garb; he was regarded as the giver of visions and the source of divination—a fact which explains the reputation of the Druids as magicians and medicine men and why the oak was everywhere sacred to him in Gaul and Prussia as well as at Dodona.

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THALASSOGRAPHY is the title by which marine investigation is in future to be known.

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M. FIZEAU, on the nature of the so-called canals on the planet Mars, makes the very probable suggestion that they point to a glacial condition on the surface of the planet, similar to that which once obtained on the earth, but of a much greater extent, in consequence of the lower temperature prevailing on Mars, and exhibiting in con-



sequence movement and ruptures of a much more pronounced character. M. Fizeau thinks that the atmosphere of Mars is much less developed than that of the earth, and that it is much more limited in extent, and therefore less fitted to absorb and retain the solar heat than the terrestrial atmosphere is. The red tint of Mars, he thinks, points to a similar conclusion.—*Comptes Rendus*.

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CONSPICUOUS objects upon oak trees during the month of August are the galls on the leaves, the spangles on their under surface, the currant galls pendant from the tips of the branches, and in the axils of the leaf-buds the oak apples. The last are the least beautiful in form and color, but the labours of Dr. Adler, of Schleswig, have invested them with an interest hitherto unfelt. He has told us a tale of wonder never surpassed or equalled by the 1,001 *nights*, a tale of truth stranger than fiction, which makes the eyes of the lover of Nature brighten with delight as he reads it. It has been long known that all the galls result from the deposition of the eggs in the plant tissues of insects of the order *Hymenoptera*, family *Cynipidæ*. In the oak apple, which is found on the branches, the *Dryopteris terminalis* is the operator. What is the physiology of the process by which the excrescences are produced is not yet known, but we know that in August or early September there emerges from the oak apple the complete insect, the males of which are wingless, while the females are winged. These winged females, says Dr. Adler, go down to the roots of the oak and there deposit their eggs, and give rise to what are known as root galls. In the early spring, the life process of grub, pupa and perfect insect is completed, and there comes forth a creature without wings, and so unlike its progenitor as to have been placed by entomologists in a different genera, and named by them *Biorhiza aptera*. It is this creature who mounts the tree and deposits her eggs in the leaf-bud or in the bark of the young branches. Then is begun that marvellous process of encystment, by which the substance grows which shelters the colony, and at the same time furnishes a nutritious food, highly nitrogenous, until the time comes for the wondrous transformation scene, in which there issues forth the children of an asexual mother, whose husband is a myth, an unexistent quantity, and without whose intervention the race is perpetuated, the most wonderful example of parthenogenesis with which we are acquainted. The life history of these creatures has been worked out upon small oak trees grown in pots and covered with gauze, the perfect insect being introduced and jealously watched while going through their life process.

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**ON GOLD-FILLING WITH ROUND-POINTED INSTRUMENTS.**

By W. GRAYSTON, L.D.S.I.

THE intimate union of particles of gold foil, which we are accustomed to call cohesion, appears to be partly due to a certain stickiness developed by heating the metal and partly to a mechanical adhesion produced by the use of serrated instruments.

This can be readily proved by making a few fillings in holes cut in the handle of an old tooth brush or other suitable substance.

In making a filling with cohesive foil and a non-serrated plugger the gold can be readily built up from a starting point to the orifice of the cavity, and the pieces of foil appear to cohere well. If an attempt is made, however, to "dig out" the plug with an excavator, it will be found that with a moderate amount of force the layers can be easily separated or scaled off from one another. An almost precisely similar result is arrived at by using non-cohesive gold and serrated instruments, working up from the floor to the orifice of the cavity in exactly the same manner. It is well known and easy of demonstration that a filling of cohesive gold, packed with serrated instruments, cuts up under the excavator like a piece of solid metal. The conclusion drawn from these experiments is, that it is necessary to consider both these forces (*viz.*, stickiness under pressure or welding and mechanical adhesion) in the selection of instruments and the manner of using them. The greatest weld is doubtless produced by a smooth-ended instrument, and the greatest mechanical adhesion by a deeply serrated one. The happy medium is arrived at by using finely serrated pluggers, and the advantage thus gained is practically proved by the fact that the majority of dentists who perform what are known as fine operations are in the habit of using these kinds of instruments. The weak point in the Herbst system of packing gold with burnishers is the want of mechanical adhesion. Dr. Herbst has now practically recognised this himself; for, in the accounts of his later operations, he is

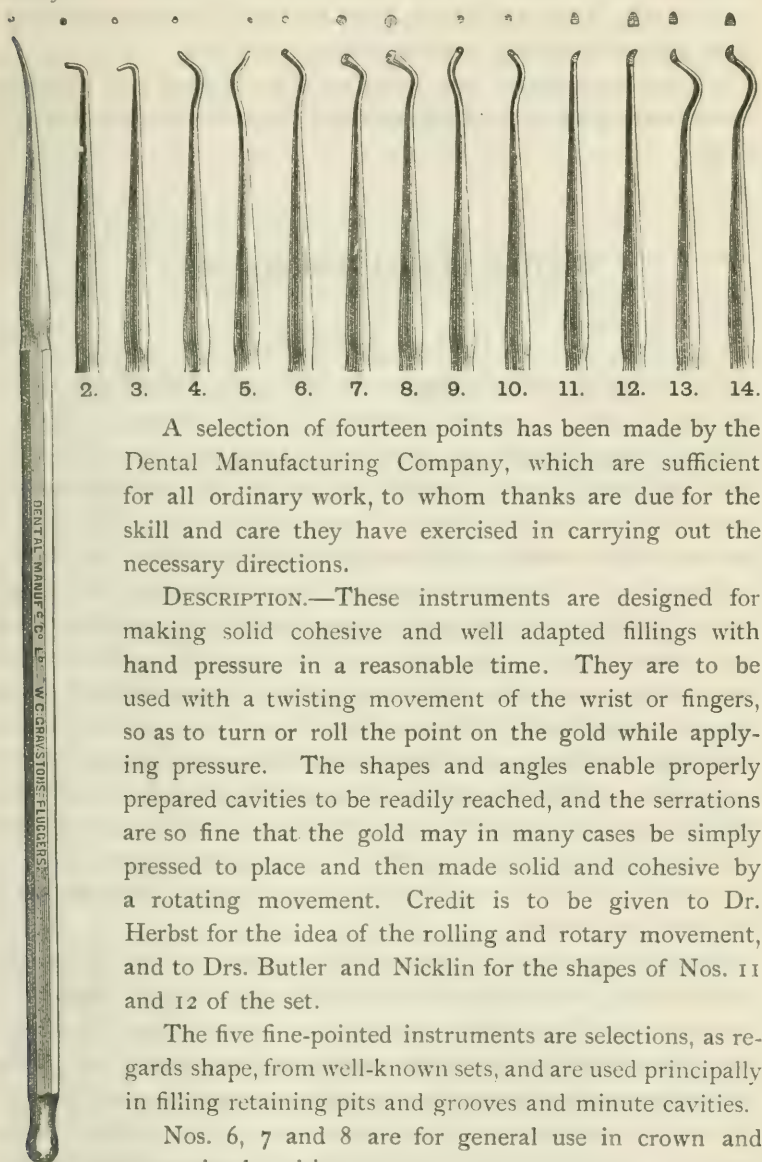
reported to "go over" each layer with an ordinary hand-plugger or broken excavator, and he does this to such an extent that his fillings are now described as being one-third rotation method and two-thirds ordinary hand pressure. Dr. Bödecker, when building up a tooth or elongating a crown by the Herbst method, states that he is careful to roughen each layer after using the rotatory instrument.

Dr. Herbst has already demonstrated that gold can be welded as well, if not better, by either hand or engine burnishers as by smooth points and malleting, and the question therefore presents itself, may not the half turn as given by Dr. Herbst to his smooth hand pluggers or the ordinary rubbing movement of a burnisher be improved by adding the mechanical adhesion of the serrated point. It has been found in practice that excellent results are obtained by the use of round-pointed finely serrated instruments. In using them, the point should be turned or rolled on the gold while applying pressure, or the gold may be in many cases simply pressed to place, and then made coherent by a rubbing motion. There is also an advantage in the use of these instruments, which lies in the fact that the gold becomes thoroughly and readily coherent under large-sized points, and consequently there is in many cases a great saving of time. The great objection to hand pressure has hitherto been the amount of time consumed in making evenly condensed fillings. It is believed that the average operator will be able to work in all cases as rapidly, and in many cases more rapidly, with these instruments than with the mallet, and in using hand pressure the pluggers may be so curved that cavities can be easily reached, which when filled with the mallet and more or less straight points present great difficulties and call forth many "back-breaking efforts."

The pluggers that are here alluded to have been regularly used for more than twelve months, and have given every satisfaction. In using them for contour work the use of a matrix is not necessary.

Several years ago it was stated by Mr. Fletcher that fillings made with cohesive gold were water-tight when packed with round-pointed instruments, while those made with the ordinary flat ends almost invariably leaked badly. Without going so far as to state that as tight a filling can be made with cohesive gold as when non-cohesive foil is packed against the walls of a cavity, it is believed that the round point produces superior adaptation with any gold, and that they are equally useful for making sound fillings with either

cohesive or non-cohesive gold, or with both combined, in the same cavity.



A selection of fourteen points has been made by the Dental Manufacturing Company, which are sufficient for all ordinary work, to whom thanks are due for the skill and care they have exercised in carrying out the necessary directions.

DESCRIPTION.—These instruments are designed for making solid cohesive and well adapted fillings with hand pressure in a reasonable time. They are to be used with a twisting movement of the wrist or fingers, so as to turn or roll the point on the gold while applying pressure. The shapes and angles enable properly prepared cavities to be readily reached, and the serrations are so fine that the gold may in many cases be simply pressed to place and then made solid and cohesive by a rotating movement. Credit is to be given to Dr. Herbst for the idea of the rolling and rotary movement, and to Drs. Butler and Nicklin for the shapes of Nos. 11 and 12 of the set.

The five fine-pointed instruments are selections, as regards shape, from well-known sets, and are used principally in filling retaining pits and grooves and minute cavities.

Nos. 6, 7 and 8 are for general use in crown and approximal cavities.

Nos. 9 and 10 for approximal cavities, where the use of a corkscrew plugger is indicated.

Nos. 11 and 12 for building up the surfaces of approximal fillings,



and are also very useful for packing non-cohesive gold against cervical walls.

Nos. 13 and 14 for building up the surfaces of approximal fillings which cannot be readily reached by Nos. 11 and 12.

These instruments are equally well adapted for packing non-cohesive gold or for combination fillings of soft and cohesive gold.

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## BRITISH DENTAL ASSOCIATION.

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### ANNUAL MEETING.

On Thursday and Friday, 23rd and 24th August last, this Association held its annual meeting in the School of Physic, Trinity College, Dublin, and met for the first time upon Irish soil, where the members were accorded a most genuine, enthusiastic and cordial welcome—in fact, a real “Caed Mille Failthe.” To say the meeting was a success would but inadequately express the result. In every respect it was more successful than any previous one. The meeting just held will show that the profession has been making rapid progress of recent years in every scientific sense. The recognition of a branch in Ireland of the Association under such pleasant circumstances as those of this visit of the members is an encouraging incident. The welcome given to those who attended by Dr. Samuel Haughton, S.F.T.C.D., is a proof that Ireland desires that such reunions upon her soil between professional men of the two countries should be frequent; and they tend equally to the advantage of the public and those that serve them in important and responsible capacities.

Much of the success of the meeting was due to Mr. W. Booth Pearsall, F.R.C.S.I. (Dublin), the untiring and energetic Honorary Secretary of the Irish Branch, and the Irish Reception Committee, who worked might and main, and who threw their whole heart and energies into the work, and spared neither pains nor expense in making a judicious conjunction of business with pleasure. Mr. Pearsall has, by his indomitable perseverance, overcome difficulties of diverse kinds which few persons would be able to do; and the meeting just past will be a lasting testimony to his great organising abilities.

Trinity College (at other times presenting a grave and sombre appearance) looked quite gay and lively. The dissecting room was set apart for the museum, and the anatomical theatre was placed at the disposal of the members for the reading and discussion of the papers. Just off the museum, and approached by two arches, was the correspondence room and temporary post office. The demonstrations, nearly thirty in number, took place in the surgical museum.

The museum was divided into four sections:—Manufactures, literature, surgical and workroom. The surgical section contained a number of pathological preparations of diseases of the teeth and jaws. This section contained upwards of 800 specimens of abnormal teeth, comprising odontomes, enamel nodules, supplemental cusps, degeneration of wisdom teeth, supernumerary teeth, abnormal number of roots, less number of roots, abnormal curving of roots, bayonet-shaped roots, oblique roots, dilaceration, germination of teeth, fusion by cementum, macrodonts, microdonts, exostosis, calcification of pulp, absorption of roots from blows or falls, erosion; salivary, pus and sanguinary calculus; mercurial teeth, arrest of decay, neuralgia, ancient teeth, pivoted teeth and replantations. The models or casts numbered about 600. Here also might be seen the various appliances used in the treatment of irregular teeth, casts of cases of cleft palate, with examples of obturators and artificial vela; examples of antique dentistry in bone, ivory and gold work. In the literature section, works in various languages were to be found—handbooks on Dental Surgery, Physiology, Mechanics, Metallurgy and *Materia Medica*. In the workroom department were exhibited the various appliances for use in the laboratory made or invented by members of the British Dental Association.

In the "manufacturers," there was a large and varied display of dental instruments and apparatus. It was, we must say, an attraction in every sense of the word. The exhibits were various and of the best quality, and had also a most important advantage of probably the best portion of the room for exhibition. The Dental Manufacturing Company, Limited, Messrs. C. Ash & Sons, Coxeter & Son, G. W. Rutterford, Hallam, and Cottrell & Co. were the principal exhibitors.

An important feature in connection with the meeting was the microscopes which, to the number of eighty, were exhibited in the Natural History Museum. There were numerous specimens of oral

anatomy, comparative and oral pathology, human and comparative, to be seen in the Museum. Amongst them there was a gorilla's jaw with a canine tooth in the ramus, the only specimen of the kind known. A number of specimens of comparative pathology were lent by the Odontological Societies of Great Britain, Trinity College and the Royal College of Surgeons. There was exhibited a photograph of an exceedingly rare bird, styled by ornithologists *Hesperonis Regalis*. Having been discovered in America, by Professor Marsh, it is one of the rare specimens of extinct birds which possessed teeth. The bones of this bird are preserved in Yale College, Massachusetts, and casts of them were lent to the association by Professor Sollas, Trinity College.

Mr. Andrew (Belfast) exhibited some beautiful lantern transparencies of photo-micrographs of teeth structure and development.

There was an exhibition of paintings held in the Leinster Hall, Molesworth Street, to raise funds for the Benevolent Fund. So far as a hasty glance at the various pictures permits a judgment to be formed, they were extremely interesting.

On Wednesday evening a dinner was given to the L.D.S.I., which was held in the Royal College of Surgeons. It was presumed that the arrangements were somewhat hurriedly made, inasmuch as many Licentiates of the College who were present at the meeting did not receive invitations.

On Thursday evening, according to arrangements, the President was to have entertained the members and their friends at a garden party, but this was rendered impossible, owing to the heavy rain which fell in the evening. However, the visitors enjoyed themselves by wandering through the Library, Engineering School and Museum, and inspecting the various treasures of these departments. In the evening a brilliant company sat down to dinner in one of the large halls of the Royal University, the president acting as host. On Friday evening, the Royal College of Surgeons was thrown open to the members, who were entertained by the Irish Reception committee at a conversazione. About nine hundred of the invitations issued by the Committee were accepted. Beyond question the assembly was one of the most fashionable and brilliant that have been held in Dublin for some time. With a view to enhancing the pleasures of the night, the College Museum was opened for the occasion, and those amongst the company who naturally inclined to

scientific study had an opportunity of spending an agreeable hour there. The gallery was reserved for promenading. The music was supplied by the band of the Royal Irish Constabulary, and a quartette party, consisting of Messrs. Williams, North, Kelly and Mullan, sang enjoyable selections, which alternated very appropriately with the admirable performance of the band. Prior to the *conversazione*, it should be stated that an afternoon tea was given in the Art Exhibition, Molesworth Street, by the Irish Reception Committee, which was an exceedingly enjoyable entertainment.

On Saturday morning the various members and visitors were conducted over the largest brewery in the world, viz., that of Messrs. Arthur Guinness, Son & Co. The party numbered about 150, and were conducted in parties of 20 by the representatives of the firm, who explained in detail the various matters of interest connected with this world-famed establishment.

When the tour of inspection at Guinness's had been completed, the party proceeded to Amiens Street Railway Terminus, where a special train was in waiting to convey them to Howth. The party was here very considerably augmented, and now numbered upwards of 200. Punctually at 12.40 p.m., the train moved off and in a short time reached Howth. The pleasure of the day's trip seemed about to be marred, a heavy shower coming on just as the party alighted from the train, but it was only transitory, and in a short time old Sol again shone out and a most beautiful afternoon followed. On arrival the party divided into two sections, one of which went on foot through the beautiful grounds of the Earl of Howth, the other being driven by a different route in carriages up to the pavilion in the Earl's grounds, where luncheon was served when the various parties had arrived. When luncheon was over, Mr. S. W. Whigham, M.R.I.A., gave a lucid, interesting and instructive description of "Gas Illumination in Lighthouses," the party also being shown the working of the Bailey Lighthouse by the same gentleman, after which the members returned to Dublin, and thus ended one of the most agreeable and successful meetings ever held by the Association.

#### ANNUAL MEETING.

The opening meeting was held in the School of Physic Anatomical Theatre, Trinity College, on Thursday, August 23rd.

The chair was taken by Mr. J. R. BROWNLIE, L.D.S.Eng.



(Glasgow), outgoing President, who called upon Dr. Haughton to say a few words.

Rev. Dr. HAUGHTON, S.F.T.C.D. (Dublin), who was received with loud applause, said: Gentlemen, members of the British Dental Association, I am instructed by the Provost of Trinity College to express his regret at not being able to receive you here in person to-day, but he has appointed me his deputy, and said whatever I chose to say to you in the way of welcome he would heartily endorse. I told the Provost I was rather a dangerous person to act as deputy, because sometimes things came into my head which, may be, ought to have stayed out of it, but as sure as ever they came into my head they came out of my mouth, and I reminded him of what he, as a scholar and a great divine, knew better than I did, the story of Balaam and his ass. I said, "Provost, remember you are appointing an ass to speak in your place," and I reminded him of a clever French play, based on the scriptural story, in which Balaam listens attentively to what the ass says, and then exclaims, "Good God, my ass speaks, and, hang me, but he speaks right well!" and I am sure I shall speak right well when, in the name of the authorities of Trinity College, I give you a most hearty welcome. Everything that is to be seen in Trinity College is thrown open to you. Professor Fitzgerald has undertaken to show the treasures of the library. I am sure Professor Reynolds will show everything in his department, and all Professor Purser's microscopes will be placed under the direction of your secretaries. There is, of course, the drawback of a falling barometer this morning, but, as far as I can make out, the rain won't come until to-morrow, so that I am sure the garden party of our excellent friend Mr. Corbett will be a brilliant success, and if rain should come, the Engineering Museum and Library will be thrown open to you. Gentlemen, in the name of Trinity College, I give you a hearty welcome.

The PRESIDENT: After hearing the words of Professor Haughton, you will agree with me that if our first meeting in Ireland be not a success, it will not be for want of a hearty welcome.

Mr. J. SMITH-TURNER (London), in the absence of the Hon. Treasurer (Mr. F. H. Canton), submitted a short report, from which it appeared that there was the substantial balance of £766 to the credit of the association.

Mr. MORTON SMALE (Hon. Sec.) read his report, which stated that the report of the past year is one of exceptional interest. We

venture to hope the members at large will feel gratified with the progress made and realize more fully how important a factor in the well-being of our profession the Association has become.

At the instigation of your Business Committee and the Royal College of Surgeons in Ireland, Mr. Partridge's name was erased from the Dental Register for unprofessional conduct. As subsequent to such removal he continued to use both the title of dentist and the letters L.D.S. in connection with his name, our solicitors were directed to take proceedings against him, with the result that he was fined £5 and costs. Earlier in the year, a Mr. Bradley, of Wisbech, was prosecuted and also fined £5 and costs for calling himself, *vis à voce*, a dentist. This was new ground for prosecution and established a new precedent.

Two gentlemen connected with the "American Dental Institute" have also been subjected to legal proceedings, their names not appearing on the Dentist's Register, but inasmuch as they held the American diploma, D.D.S., this was also a novel proceeding. On Tuesday last the magistrate delivered judgment and fined them in £5 and costs, making therefore three successful cases of prosecution during the year. The defendants have appealed to the magistrate to state a case for the opinion of the Court of Queen's Bench, and leave has been granted.

During the year many cases of illegal infringements of the Dental Act have been reported to your Hon. Sec., and the Association has been successful in no less than ten cases in causing the offenders to either cease practising altogether or forego the assumed designations. Your Committee, supported by the West of Scotland Branch, took steps to prevent the Exhibition of Dental Specimens at the Glasgow Exhibition. Unfortunately we were not so forward in regard to one of the foreign exhibitions in London, and one of these disgraceful exhibitions of a dentist's workroom may be seen in working order. Fortunately it attracts little notice. The Association will be glad to hear that the authorities at Guernsey have passed an ordinance prohibiting in future anyone practising dentistry in that island without being in possession of a diploma as L.D.S. from either England, Scotland, Ireland or France.

The numerical strength of the Association has largely increased. The number of members last year was 645, while to-day it is 750, showing an increase of 105. 10 members have been removed for non-payment of subscriptions against 9 last year, and there have

been 4 deaths; the actual number of new members, therefore, during the year has assumed the grand total of 121.

Many members of our profession have held aloof from the Association for the reason that your executive have exhibited great discretion in the matter of prosecutions, never during the nine years of its existence having suffered defeat. It is to be hoped that those who, for the above reason, have not joined us, may, in the light of the recent litigation, see their way to throw in their lot with us. by their presence and their purse with the former, for unity is strength with the latter, for legal proceedings are expensive.

The report was adopted.

The SECRETARY intimated that an invitation had been received from the Southern Counties' Branch to hold the annual meeting for 1889 at Brighton, on 22nd, 23rd and 24th August. The invitation was accepted, and Mr. S. Lee Rymer, J.P., was appointed President-elect.

Mr. GEORGE CUNNINGHAM, L.D.S.Eng., B.A.Cantab., D.M.D. (Cambridge), then read a report by a special Committee appointed by the Representative Board to carry out resolutions passed at last annual general meeting with regard to "The Dental Aspect of Public Health," in the course of which he said: As the result of the examination of the mouths of the recruits entering the army, we may take it that on the average each army recruit would require the following operations to reinstate the efficiency of his dental armature: two extractions, four fillings, scaling, and gum treatment.

As the carious cavities and the necessary operations will be for the most part simple, it is calculated that an experienced operator should perform these operations in about  $1\frac{1}{2}$  hours. Allowing 265 working days to the year, with an attendance of 6 hours daily, it is calculated that a surgeon-dentist could attend efficiently to four men per diem, which would thus give an annual total of 1,060 mouths to put in order. If, on admission to the ranks, the teeth of all army recruits were thus put in a state of efficiency, and proper attention was given to their being kept in a state of cleanliness, the subsequent dental treatment necessary to maintain that efficiency would not be very great, if periodical dental examinations were made. Probably the army surgeon-dentist could efficiently attend to 8 men per diem, giving an annual total of some 2,120 mouths per year. With regard to the navy we have not such reliable data on which to base

an opinion, but inasmuch as the naval recruit is younger, and the severity of the examination of the teeth is much greater than in the army recruiting department, the average attention per recruit would be less than in the case of the soldier. This view is borne out by an investigation of the work done at the Dental Hospital of London on the recruits sent by the London Naval Recruiting Department. A naval surgeon-dentist, then, might be expected to make more recruits efficient and maintain the efficiency of a greater number of sailors than his army *confrère*.

The President of the Southern Counties' Branch determined to take advantage of the fact of the last Annual Branch Meeting being held in so important a military and naval centre as Portsmouth to call attention to this important subject. He therefore invited the committee to move a resolution on the subject. The following resolution was therefore adopted:—"That this association is strongly of opinion that, in the interest of the State, some provision should be made for attention to the teeth of our soldiers and sailors, and that the Special Committee appointed by the British Dental Association for that purpose be encouraged to bring the matter urgently before the proper authorities." The words in which Surgeon-Major Crowe, of the Army Medical Staff, seconded the resolution, are worthy of being specially noted, as, no doubt, it is good evidence that the callousness or indifference of the administrative medical officers at headquarters should not be shared by all the executive officers of the A. M. D. He said the question was one of great importance. He had served upwards of 20 years in the army, and his experience as a soldier fully supported the views of the mover of the resolution. Many a soldier was invalided owing to ill-health caused by defective teeth; and he considered that if the British Dental Association would bring such pressure to bear on the authorities as would induce them to give the soldier attention, they would prove a good friend to the soldier. Abroad the soldiers suffered much from decayed teeth, particularly in the West Indies and India, and were practically without assistance. Medical officers in the army were not required to know anything about dentistry to qualify them for a commission. The only dentistry he had seen in 20 years was the extraction of teeth; as to stopping teeth he had never attempted it, nor seen it attempted. After carefully considering the whole matter, both as it related to the army and the navy, the Committee determined in the first instance to approach the naval



authorities. That had been done, and the following reply had been received :—

Admiralty, 23<sup>rd</sup> May, 1888.

SIR,

I am commanded by my Lords Commissioners of the Admiralty to acknowledge the receipt of your memorial dated the 30th ultimo, requesting permission for a dental practitioner to examine the recruits passing through the London depôt, and in reply I am to acquaint you, for the information of the R.B. of. B. D. A. that their lordships are advised that no benefit would accrue to the recruiting of men and boys for the navy by the adoption of this proposal, and that the arrangements at present in force provide for all the requirements in the matter.

I am, Sir,

Your obedient servant,

Morton Smale, Esq., London.

EVAN MACGREGOR.

The Committee, having duly considered that reply, are of opinion that, before proceeding further in the matter, some direct personal influence must be brought to bear before it endeavours to obtain a reconsideration of the memorial. The Committee feel, therefore, that they must appeal to the individual members of the Association to use their personal influence to promote in every way some expression of public opinion on so important a public subject.

It is extremely desirable that, since the question is of public rather than professional concern, efforts should be made to induce the press to take up the question and give it the prominence which is essential to its recognition.

The PRESIDENT said the report of Mr. Cunningham was so complete and exhaustive that he felt quite sure the meeting would unanimously adopt it. Report adopted.

Mr. FISHER (Dundee) then read a report recommending that attention to the teeth of school children should be compulsory; and he asked the executive to vote £10 to arrange certain preliminary work.

Mr. J. R. BROWNLIE (the out-going President) then delivered his

#### VALEDICTORY ADDRESS,

in the course of which he said :—We have now all but completed another year of the British Dental Association, and it only now remains for me to hand over to the successor you have appointed the honourable office with which you invested me a year ago. Whatever estimate we may severally have formed of the past year's proceedings, it will generally be conceded that it has

been a markedly progressive one. To it belongs something of a historic interest. It has witnessed a new departure in the development of the Association. For the first time in its history, we have met upon Irish soil, and on the invitation of an Irish branch, to hold our annual meeting. I shall carry away with me the happiest memory of my tenure of office that it fell to my lot to preside over this first gathering of the British Dental Association on Irish soil—the first and, we will hope, the beginning of many happy reunions, by which the importance, the influence, and the resources of the British Dental Association cannot fail to be greatly augmented. Certain is it that the welcome which our Irish brethren have prepared for us and the arrangements entered into for the furtherance of the work of the Association, cannot but inspire the very happiest anticipations from the formation of an Irish branch, which is so happily representative of unity, nationality and progress. To have attained a representation all over the country is indeed a fit subject for congratulation. After alluding to the fact that a united representation conduced to the benefits of the Association, he went on to say: Surely, it would augur well for the Association during its next decade if the men whose names we had reason to expect to find, but looked for in vain, in the original list of members—thoughtful, prudent, and sufficiently disinterested members of the profession—are awakening to the importance of the movement and to their duty in regard to it. They can no longer rest content to be mere spectators, and are coming forward to lend their aid in the establishment of order and good government. Would that it were so and that the number was greater.

But there are still estimable members of our profession, men capable of doing credit to it, and who are training up sons to follow in their footsteps, doing all they can to make them better practitioners than they themselves have been, sparing no outlay upon education and special training, that these sons may be efficient in every department of their calling, doing everything in their power on behalf of the individual, and just nothing at all on behalf of the profession to which they belong and of which they have made choice. They are like men greatly interested in the quality and quantity of the cargo with which the ship is loaded, yet giving no heed to what should be the first consideration of seaworthiness—of the ship itself. They may be described as loading with the knowledge of serious defects in the vessel's composition. Speaking of what proportion of

names on the Dentists' Register which should also appear on the British Dental Association roll, the speaker said: We are better without a very great many of them, for we have to deplore that this Register, which was designed for such a better purpose, should have been marred in the very beginning by so much inaccuracy and misrepresentation. That an instrument intended to be a trustworthy guide should have been, by extraneous influence, converted into a means of setting forth fraudulent claims, and of creating the new distinction for the charlatan of "registered dentist," such things are disappointing, but they are not fatal. We can afford to give them due weight, for the account has been more than balanced by the substantial gains of the past few years. Speaking of the membership of the Association, he said: The Dentists' Register has not proved the fortress we thought to raise, but here is a citadel which we may render impregnable; here is a register of which we have absolute control, resting not upon a legal view of the scope and interpretation of an Act of Parliament, but founded upon the estimation in which his fellows hold each man's claim to belong to the dental profession. Proceeding, he said: It seems to me that the period is approaching when the profession will be divisible into two main sections; a time when respectable neutrality will become harder and harder to maintain, and the man who does not choose to associate with his fellows may have to be content to be classed with men so bankrupt in status and reputation as to be unfit for the membership of an Association whose vitality is dependent upon the largest possible membership. For the future we may well predict for the British Dental Association much greater things than we have seen in its past. The test of time is being applied to its fitness to cope with the work it has undertaken, and it begins to be evident that its power for good will be in proportion to the number as well as the efficiency of its branches. Concluding, Mr. Brownlie said: Do we realise that branches are not, need not be, mere echoes of the parent society?—that they have functions to perform and opportunities for work which the parent society cannot exercise, and does not possess. This is not a case in which numerical strength and efficiency go hand in hand. Weeds grow apace, and the most close and constant supervision is wanted to keep them down. For such work we want branches—more branches—strong branches if we can, but many and many rather than strong. Large districts may mean—probably does mean—less perfect supervision; and how, for instance,

is the purity, the rescue, of the Dentists' Register, to be attained unless such work be thoroughly well done. Let our branches be fully alive to the importance of their trust—to the extent of their opportunity. Let districts be kept within workable limits, that local officials be not burdened. Let branch officials understand that they are expected to be able to give an account of the pretensions of everyone claiming to practise our art in their respective districts. Then will the British Dental Association more fully grasp the situation, and be more adequately prepared to encounter those powers for evil against which it seeks to make a stand. Let us look to perfecting our arrangements. The work to be done requires attention and efficient organisation. It will require some effort, but if we will, the issue need never be in doubt.

Mr. J. CLOUGH CLARK (Belfast) moved a hearty vote of thanks to the outgoing president for his services during the past year. He said he thoroughly deserved it. He had the pleasure of knowing him for some time. He had worked hard in the interests of the Association. The office of president was no sinecure, but the president had brought his large mind and talents to bear, and as a consequence he made a most efficient president. He left the chair carrying with him the hearty good wishes of every member of the Association.

Mr. HAZELTON (Dublin) seconded the motion and it was carried by loud acclamation.

Mr. BROWNLIE briefly responded and vacated the chair, which was taken by

The new President, Mr. DANIEL CORBETT, M.R.C.S., L.D.S.Eng. (Dublin), who was received with warm applause. He delivered an

#### INAUGURAL ADDRESS,

in the course of which, after welcoming the members and referring to the completeness of the museum, of which he attributed the credit to Mr. Booth Pearsall, Mr. Stack, and Mr. Baker, he said they saw in that museum the evidence of refined scientific investigation, skilled manual and digital dexterity, and mechanical contrivances of no ordinary merit. He said, when deliberating as to what should be the nature and tone of his address, it occurred to him that a brief retrospect of his early professional career might not be devoid of interest. Allow, said he, your imagination to travel back sixty years, when hot water as a means of



softening wax used for taking the impression of the mouth was not known, or the tray for holding same when ready for use, the colouring of the model as a means of assisting the efforts to let down a block of bone cut from the tooth of the hippopotamus, out of which an imitation of teeth was to be carved, and you will form some idea of the means of instruction at my disposal when I commenced my professional education. Six weeks was the usual time spent in the manufacture of a complete denture. When working bone and natural teeth, each tooth was drilled through the pulp chamber, a silver tap screwed into it of required length and rivetted, in the ordeal often split in consequence of the dryness of the tooth. Before the use of human teeth became general, it was customary to use exclusively the hippopotamus tusk; sections were cut to suit the required curve, the enamel carefully preserved, and so cut as to ensure a front aspect of enamel on the tooth carved. When human teeth were in fashion, they were usually had from the graveyard, and I recollect what attention was paid the gravedigger, at his periodical visits to my father's house with his gleanings from the coffin. His visits were generally at night, and no hospitable duty in which my father might chance to be engaged was permitted to interfere with the reception of this ever-welcome visitor to the "*sanctum sanctorum*" of the house. The President then referred to the introduction of gold plate as a means for mounting artificial teeth, stating it dated from the commencement of the present century. He described in detail the operation of mounting prior to the introduction of gold plate, commenting on the laboriousness of the work. In 1825, he said, composition teeth, called at the time "Teno Metallic," were introduced to public notice, which increased the labour of the dentist. To Mons. Audebrow, of Paris, they were indebted for this invention. In 1829 his father went to Paris to learn the processes of manufacture of the "Teno Metallic Teeth," and returned to his native city, Cork, with the necessary information as to the materials used and the *modus operandi*, and he was proud to think with the introduction of these now highly prized and indispensable articles into this country the name of Corbett will ever be associated. For some years, said the President, we laboured at the manufacture of the slate teeth with the usual uncertainty, meeting disappointments when least expected; but satisfactory results at times encouraged us to persevere further in our efforts to produce a perfect article. In the year 1832 a Mr. Hallett called upon my father for the purpose of

introducing to his notice a new form of mineral tooth, solid, of the natural shape, and having a tube in it to carry a pivot in lieu of the soldering platina points, which characterised the French pattern tooth, and as the specimens exhibited were a decided improvement, my father readily consented to accept Hallett's terms for the necessary information regarding their manufacture. I regret I am unable to show you some of those same teeth, but I can a drawing of the furnace used in firing them, the receipt of the different ingredients entering into their composition, all in my father's handwriting.

Gentlemen, you will see in our museum to-day these beautiful specimens of mineral teeth manufactured by Messrs. Ash & Sons; they are the outcome of information given to that firm in 1837 by my brother. As a representative of the old school of mechanical dentists, I am disposed to indulge in a little variety when I recall all we were able to do, and the style of work done in those days when we had no assistance, and witness the present state of things. I am inclined to indulge in a little poetical exaggeration, and compare one to the labours of Hercules, the other to that of Paris, when given as a task the allocation of the *Pomum Discordias*. In our meeting here to-day we have a threefold object to attain: we are here to thaw that rigid formality, jealousy, and reserve which has hitherto kept us estranged from each other, and "froze the genial current of the soul;" we are here to eradicate that noxious weed of empiricism and humbug which still grows rank, and "rots itself at ease" in our very midst; and we are here to sow the seed which will vegetate, fructify and grow into a tree, from the branches of which will suspend the lamp of scientific knowledge and persevering research which, like unto that Promethean fire the Persians burn in the mountains, will flame night and day never to be extinguished; it will illuminate our onward paths to eminence and celebrity, and direct a discerning public in their search for cultured professional service.

Dr. SMITH (Edinburgh), in moving a vote of thanks to the President, said opening addresses were now becoming more difficult, because the materials were becoming more scarce. The President had given them a short, pretty and instructive address. He had much pleasure in moving the vote be adopted.

Mr. JAMES SMITH-TURNER (London) seconded the motion, which was carried by acclamation.

THE PRESIDENT: I beg to return my thanks to the society and to

the ladies and gentlemen for the kind way in which they received the motion just passed.

The President then called upon Dr. R. THEODORE STACK (Dublin) to read his paper on

#### DENTAL ETHICS,

in the course of which he said, as the topics of which this subject must necessarily be many and various, I consider it advisable that any discussion which may arise should be limited to the question, "Is it advisable, or is it not, that an ethical code should be established?" As long as the term dentist signified unknown quantity, it was impossible to lay down any general code of relation between him and the general public. Previous to 1859 there was, as far as dentists were concerned, a general chaos, and Sir J. Tomes succeeded in inducing the English College of Surgeons to establish a diploma. The chief principles laid down by Sir J. Tomes was, that the education of the dentist required a peculiar combination of mechanical and surgical training, and that this combination was not to be found in the curriculum laid down for the general surgical diploma. The spirit of this movement culminated in the Dentists' Act of 1878. Dentists, since the passing of this Act, are bound as far as they can and have an opportunity to assist in the training of a proper supply of dentists to meet the requirements of the public. The dentist should recognise the duty of being particular, forbearing and tender with young children, and endeavour to train up the new generation to believe that a visit to the dentist will not entail pain. He should maintain the dignity of an educated gentleman; as far as possible be regular and punctual in his engagements, and considerate of the time of his clients. He should be courteous, firm, humane, cool, steady, temperate and genial. With reference to the attitude of medical men to dentists, they should be trained as students for a large portion of their curriculum on the same benches with the dentist, and as a result the seeds of mutual respect and appreciation would be sown. This would be a sure remedy for those despicable and unworthy feelings of jealousy, wounded dignity and contempt, which bring alike discredit and disgrace on those who give them expression. It is immoral to do gratuitous work for the medical man in the hope that he may send the dentist patients. A dentist calling upon another should not be detained. It is a piece of vulgarity and stupid affectation to keep a brother dentist waiting with the object of impressing him with the number of your appointments. When two

dentists arrange consultation, punctuality is incumbent on both sides. Dentists should embrace all reasonable opportunity of meeting one another in professional meetings and gatherings.

Mr. WM. BOWMAN MACLEOD (Edinburgh) advised that the opinion of branches should be obtained regarding the subject of Dr. Stack's paper. He disapproved of gratuitous service to medical men in the hope of obtaining custom.

Mr. WILLIAM BOOTH PEARSALL (Dublin) advocated a broad consideration of this question, and pointed to army and navy etiquette, saying he did not see why dentists, as educated gentlemen, should not have a like code to guard them.

Dr. ANTHONY H. CORLEY, F.R.C.S.I., then read his paper on

#### ANÆSTHETICS IN DENTAL SURGERY.

As anæsthetics originated in surgical dentistry, he considered a discussion on it by educated and scientific surgeon-dentists, like the members of the Association, would be of the deepest interest to every branch of surgery and medicine, in which this greatest of God's earthly boons was necessary. He said he would dwell upon three aspects of the subject. First, on the choice of anæsthetics; second, the modes and appliances for their use; and, third, the dangers which the precautions rendered necessary. He proposed to deal with three agents—chloroform, ether and nitrous oxide. In their use larger experience of late years had given more comprehensive knowledge and greater confidence. The more frequent and universal employment, notwithstanding the occurrence of accidents, shows that the record of casualties has a steadily decreasing ratio. That statement should not be taken as an argument for their indiscriminate use. It was the result of increased knowledge and experience and skill, and even with these there is a certain margin of not-to-be-foreseen accidents surrounding them. These dangers should not be looked upon as prohibitive, but they enforce the necessity for making, previous to their use, a thorough investigation into the general constitution and local condition of the patients. The generally admitted fact that the dangerous symptoms occasionally attending the employment of chloroform affects the heart, points to the necessity of knowing its state, vigilantly watching its action, and taking care that all the precautions required for maintaining its action or restoring, in case of failure, were attended to. He might refer to a most valuable paper by Dr. Thomas E. Little on that



subject in the *Irish Hospital Gazette* of 1874, in which the dangers of anæsthesia were exhaustively treated. With ether, the dangers seem to originate in the lungs and brain, and rendered a knowledge of the conditions of these organs urgently necessary and essential. As this drug gave more indication of the approach of danger, and as the record of accidents was less, he gave his preference to it in serious operations, although its administration was usually attended with more difficulties and troubles, and was much more unpleasant to the patient. In speaking of nitrous oxide, he alluded to its comparative safety, its suitability for brief operations, and its freedom from unpleasant effects to the patient, either during or after its administration. On the special subject of anæsthesia in dental surgery, he dwelt upon the local conditions, their influence upon the choice of agents, &c. He quoted statistics collected by Professor Lyman, of Chicago, as to the comparative safety of the three anæsthetics. Ether was stated to have one fatality in 23,000, nitrous oxide one in 140,000, whilst chloroform is variously estimated as giving one fatal case in 3,000, in 6,000, or in 10,000 administrations. Concluding, he dwelt upon the extreme importance of the subject to dental as well as ordinary surgeons. A limited number of the community, comparatively speaking, ever required the procedures of general operative surgery. On the other hand, how numerous and how increasing was the class whose applications were treated by dental surgeons. How few would suffer any length of time the excruciating pangs of toothache but for the dread of the horrible, though brief, agony attendant on even the most skilful extraction. Having experience of both, he would accept gladly the aid of anæsthesia in his own case, notwithstanding its occasional risks. To understand, foresee and diminish these was equally an object with our whole art and its various branches.

A prolonged discussion followed on the subjects of the choice of anæsthetics, the dangers of their application and the apparatus, the methods and precautions to be observed.

Dr. CORLEY explained an easy and efficient method of administering ether, by means of a towel folded in a conical shape, and having the ether in a sponge fixed in the apex of the cone.

The PRESIDENT said the paper just read promotes considerable discussion, and called upon those gentlemen who had experience in anæsthetics to express their opinions.

Mr. A. R. F. KING quoted a case where ether had been administered per rectum, the patient being under the influence in seven minutes, whilst the operation was over in twenty minutes. The ether was boiled, and the effect was very complete.

Mr. CLARKE (Belfast) supported the use of laughing gas and did not see what other means were required, because the present mode was quite safe and, in his estimation, as good as any other.

Mr. KING said he brought forward the case mentioned because sometimes it was impossible to administer by the mouth.

Mr. A. UNDERWOOD wished to see members of the Scotch school of thought express their views. He quoted a case which came under his observation.

Mr. S. J. HUTCHINSON considered chloroform should not be allowed to be used in the dentist's house. He suggested, as a mere matter of prudence, that the patient should be asked to fast for a period before the operation, and considered the patient's own house the more preferable place for the administration. The fastenings of the patient should all be loosed.

Dr. CORLEY replied to the several points raised.

Dr. A. W. W. BAKER, M.D., F.R.C.S.I., read a long and very interesting paper on the

#### ANNUAL MUSEUM AND ITS CONTENTS.

In it the contents of the museum were to a large extent fully described, and special attention called to such objects as were of a peculiar interest. Dr. Baker said, when forming the museum, they were at first disposed to lay aside many specimens which did not appear to be of especial value, but they fortunately had kept them and grouped them, and they were excessively glad that they had done so, because, by such grouping, the one specimen elucidated the other. Those who had never arranged a collection had but little idea of the difficulties connected therewith. In many instances specimens were sent with no further history than their owner's name and address, and, indeed, in some cases not even that; these they had to diagnose, describe and remit to a classification. Then the classification gave them many an hour of anxious thought; for instance, in many cases of fusion of teeth it is difficult to decide whether it arose through developmental abnormality or a pathological increase of the cementum, or to determine whether a particular tooth was of the species known as warty or a supernumerary. Since the museum

had been formed he had heard men exclaim, "Oh! I had several specimens like this, but I did not think it worth my while to keep them, much less make a note of them." By the grouping of a large amount of material which, taken individually, has but little significance, they were enabled to draw conclusions which may lend important aid to future investigations. He therefore urged upon all the importance of keeping accurate notes of specimens, not trusting to memory, which was apt to be treacherous, but carefully making in black and white a trustworthy record upon which hereafter securely to found scientific conclusions. Speaking under the heading of mercurial teeth, he said they had retained the name "mercurial" for the teeth in that class, not that they believed that the peculiar marking was caused by the administration of mercury for the maladies of early childhood, but because the term, associated with Mr. Jonathan Hutchinson's excellent description, conveyed the idea of a malformation with which they were all familiar. To the eruptive fevers is traced the suspension of the functions of the enamel organ, and also the odontoblast cells. To the category of chicken pox and measles he would add whooping cough, which, in his experience, is a most patent factor in the production of this deformity. The central incisors belonging to these teeth also frequently present that notching which is so characteristic of hereditary specific diseases, with this difference, that the incisors are not peg-shaped, and are not placed at that peculiar inclination to one another which is almost a diagnostic peculiarity in Hutchinson's teeth.

The meeting then adjourned.

#### SECOND DAY'S PROCEEDINGS.

On Friday the Association resumed the proceedings. At 9 a.m., the business for the day commenced by a series of Demonstrations, nearly thirty in number, which took place in the Surgical Museum of Trinity College. The room was large, well lighted, and tastefully decorated with floral and other ornaments. Amongst those members who took part were the following :—

Dr. WALKER (London) showed a series of casts of plaster of Paris to demonstrate the relative contraction, expansion, &c., when mixed with hot and cold water, also with a solution of salt, potash, &c. He also exhibited an adaptation of the rotating swivel screwed into a metal socket, which at the same time presented a plane surface for the eyelet to work upon.

Mr. GEORGE F. GRANT showed a patient whom he had treated for cleft palate, the dies, &c., being presented.

Mr. CHAS. CUNNINGHAM, with M. WIRTH (of Paris), demonstrated the working of a dry steam vulcanizer. The machine was always kept hot by the steam generated in the water boiler. By means of a valve the steam could be admitted to a vulcanizing chamber, and the flask, when heated therein, could be closed and locked automatically.

Mr. J. SMITH-TURNER showed Dr. Kingsley's method of making artificial vela.

Mr. GEORGE CUNNINGHAM demonstrated the operation of implantation.

Mr. BALKWILL demonstrated open gold filling with smooth-ended pluggers.

Mr. GARTRELL showed his excellent method of adapting removable bridge-work with continuous gum.

Mr. BRUNTON demonstrated the use of his matrix, the binding clamp being capable of folding up out of the way.

Mr. RHODES inserted a gold filling, using cohesive cylinders and hand pressure.

Mr. R. H. WOODHOUSE inserted a gold filling with tin at the base, and by hand pressure.

Mr. T. COOKE PARSON executed a contour approximal gold filling.

Mr. R. F. H. KING demonstrated gold filling with hot gold points in very frail teeth.

Mr. ALFRED JONES inserted a gold filling in an approximal cavity of an incisor, using a new pneumatic mallet. The mallet is by Messrs. Lennox & Thomas (Cambridge). The air is driven from a Fletcher's bellows, and the mallet is arranged to give blows rapidly intermittent, at will, and on pressure of the plugger point.

Mr. WOODRUFF inserted a gold filling, using the electric mallet.

Mr. FERNALD inserted gold fillings in the approximal cavities of two centrals.

Mr. LLOYD WILLIAMS used cohesive gold with tin and gold floor and the electric mallet with foot connector.

Mr. J. J. ANDREW (Belfast) showed the practical working of an electric mallet driven from an accumulator of three cells, which would work for fifty hours and cost 1s. 6d. for recharging.

Mr. J. C. CLARK (Belfast) also showed an accumulator or secondary battery, driving mallet, engine motor and lamp. This



storage battery was by Messrs. Clark & Grindle, and would supply engine and mallet for about eighty hours.

Dr. ST. GEORGE ELLIOTT crowned an upper molar.

Mr. JOHN A. BIGGS demonstrated the preparing of an artificial palate from taking the impression and the insertion of the gold plate with velum acting physiologically.

Mr. CLAUD ROGERS exhibited his method of making an artificial nose. In one case, where the end of the nose was lost by lupus, the tip of the substitute was of flexible rubber covered with thin rubber-dam like material, moulded on steel dies. He also demonstrated the application of the Knapp blowpipe and Dr. R. Knapp's method of making crowns and bridge work.

Messrs. W. CAMPBELL & BOWMAN MACLEOD demonstrated the taking of plaster impressions.

#### THE DENTAL BENEVOLENT FUND.

At half-past twelve o'clock, the demonstrations being over, the annual meeting of the Dental Benevolent Fund was held in the Anatomical Theatre, Trinity College. Dr. DANIEL CORBETT, President of the Association, occupied the chair.

The Treasurer's report stated that donations have steadily increased since the formation of the fund in 1884, and a successful effort had been made to increase the invested capital to £1,000 as a Jubilee Memorial. The receipts from all sources for the year ending June 30th amounted to £426 1s. 11d. This sum is made up thus:—Donations, £159 5s.; subscriptions, £242 19s.; and interest on investments, £23 17s. 11d. Besides these receipts there was banked at the commencement of the year £235 8s. 5d, making a grand total for the year of £661 10s. 4d.

The President having put the motion to the meeting, declared it carried unanimously.

The President at this stage handed his donation of £10 to the fund.

The report of the Committee of Management stated that the number of children being educated at the expense of the fund was now thirteen. The Committee deeply regretted that they had to refuse the application from two orphans on account of there being no adequate funds to grant them any permanent relief, and for this and other reasons the Committee most earnestly appealed to the profession and other friends for more annual subscribers and donors.

Mr. BROWNE MASON regretted the fund was not more heartily

supported, as it ought to be much better kept up than it was. They wanted to get those who hitherto had held aloof to subscribe to this fund. He hoped, when the report was published, more members would be led to subscribe, and also that the present proceedings would lead to increased subscriptions.

At half-past two the Association again met in the Anatomical Theatre, when the reading and discussion of papers was resumed.

The PRESIDENT (Mr. Daniel Corbett) occupied the chair.

Mr. WM. BOOTHE PEARSALL, F.R.C.S.I., read a paper on

#### THE USE OF IMAGINATION IN THE DESIGN AND CONSTRUCTION OF ARTIFICIAL TEETH.

He said, during the past twenty years operative dexterity as opposed to mechanical ability has made so much progress, especially of restoring the forms of diseased teeth or roots, and the younger members of our profession have had the importance of mere operative skill so strongly impressed on their attention, as well as their professional ambition, that it seems as if mechanical dentistry as an art is in danger of falling into undeserved neglect. Some members of our profession are sanguine enough to believe that mechanical dentistry will become obsolete in the immediate future that now awaits operative dentistry. Be this belief right or wrong, I think all of us who carry on a mixed practice, partly operative, partly mechanical, are agreed that a large number of cases will still present themselves to us for advice.

Some of our pessimistic brethren consider that excellence in mechanical dentistry has been on the wane for some years, and the credit of this baneful state of things has been credited to the unsuitable employment of vulcanite. I venture to think, however, that with the selection of the various materials modern science has placed at our disposal, a dentist can still show skill and inventive quantities of a high order, whether it be in gold or in vulcanite, or in the new continuous gumwork, which has hardly become more than a decoration to mechanical work as yet. I am at a loss to understand how mechanical skill could degenerate, as I am of opinion that a well-designed comfortable denture, fulfilling the objects of its being, does a dentist as much credit as a practitioner as an elaborate gold or porcelain contour filling that may be lost to the patient from a simple cold setting up peritonitis in the socket, that even the wonderful advances now seen in operative treatment may not be able successfully to subdue.

From some years' observation there is, I regret to say, far too great a proportion of badly-designed and inartistic work produced than might seem warranted, when we remember how energetically the dental schools have been carried on for the past twenty years or so, and it is with a view of rousing my younger brethren to take a more hearty and personal interest in their workrooms and mechanical processes, with artistic aims, that I venture to speak to you upon this subject.

In constructing or designing artificial teeth, one of the safest rules the conscientious practitioner can take to heart is that embodied in the *argumentum ad hominum*, Would he like to wear it himself? and I am thoroughly convinced that many professional pitfalls are brought about by the too frequent habit of studying the plaster model rather than the patient. I would therefore earnestly urge the cultivation of a habit of endeavouring to picture or imagine in your mind the nature of the appliance you propose to supply to your patient, with all the details so distinct and real that you could make a drawing from them or model them, if you wished, before you even placed the impression tray in the patient's mouth, and it is the use of this precious gift of imagination that enables the users of it to shine in poetry, painting and literature, and all the inventive arts and sciences.

In the first place, as you examine the patient, you should be able to picture in your mind the original condition of the mouth; you ought to be able to determine how far the muscular action of the cheeks and mouth will affect the stability of your work; you ought to be able to determine the amount of pressure the patient can bear in mastication; and, possibly, be able by judicious observation to avoid the pressure spots so frequently produced by ill-designed work on movable surfaces of the mouth.

The points I would dwell upon as likely to lead to an artistic result in the construction of artificial teeth is a careful study of the natural expression of the mouth by making experiments with suitably moulded waxy plates. The careful selection of suitable teeth in harmony in form and colour with the face and mouth of the patient, and the correct centring of the teeth when set up or mounted, not by rule but by direct observation, not altogether according to taste, as the cookery books say, adopting a bold style or the reverse, but rather by the careful noticing of the characteristics of each case with which you have to deal. The careful and deliberative trying in of

the work during the different stages of its progress often affords most valuable hints, not only from the point of view of your own experience but that of your patient, and I confess to enjoying the criticisms at this part of my work of an intelligent patient, while correcting the deficiencies of the model or preserving its excellencies. Last, but not least, is the painstaking adjustment of the dentine in the patient's mouth after it has been continuously worn for twenty-four hours, carefully noting the friction spots on the mucous membrane as well as on the plate, and studiously paring or dressing away those on the teeth with a scholarly perception of their relative importance, as well as by careful fine fitting of the articulation after the patient has had at least forty-eight hours' experience in the use of your appliance. How does it happen that some practitioners, after the sittings necessary for the construction of a denture, are seldom required after its completion to see their patients more than two or three times? and then only for some trifling adjustment of the bite or friction spot on the gum; while other practitioners, who are just as skilled workmen, keep their patients in prolonged and unnecessary discomfort for days or weeks after the case is "finished." In the first case the battle of difficulty has been fought and won by the dentist before his work was worn by the patient; in the second case careless or inaccurate models may be the cause, or the design of the case has been left to an assistant who has almost certainly never seen the mouth, the lamentable result often brought about by the neglect to make proper observations at sittings given by the patient for the purpose of trying in. If it takes a master of his art like Sir John Millais for sixty or seventy sittings to produce a portrait, do you not think the average dentist ought to neglect to give the same deliberate care to his work. Want of the power to design or, in other words, the power to imagine, how a case ought to look when finished, is in my opinion one of the greatest defects a dentist can be afflicted with.

The PRESIDENT said the subject had been treated in a lucid manner and in accordance with his feelings. He believed they would be almost unanimous as regards the various points named in the paper. He regretted very much that the manufacturers were not present with them that day. He hoped their curiosity would be aroused by the paper just read, and that good would result.

Mr. T. BROWNE-MASON (Exeter) trusted the paper would stir up the manufacturers. The manufacturers were the persons paid, and it would pay them to study this matter.



Mr. F. H. BALKWILL (Plymouth) discussed the question of rhomboidal molars, and agreed with Mr. Pearsall's remarks thereon.

After further remarks by Mr. J. Smith-Turner, Mr. Kirby, and Mr. Murray,

Mr. PEARSALL replied. He wished the members to put their heads together and get a new tooth. He had hoped to prepare some models, but, owing to the attention which he had to give to the details of the meeting, he had been unable to have them made.

#### ON SOME WORKROOM APPLIANCES.

By A. I. WATTS, L.D.S.I. (Dublin).

He said that workroom appliances should receive more attention from dentists than they hitherto had. The various manufacturers did their best to supply their wants, but it was hardly possible that they should know what kind of tool would best suit a dentist for use in workroom or surgery.

There could be no doubt that instruments used for operations were far better designed for the work they had to do than were the tools usually sold for the workroom, and for a very simple reason, that these instruments were designed by the best operators.

For some time past Mr. Pearsall and himself had endeavoured to reform and invent several tools or appliances, which had proved to be very useful and, he would venture to say, were a decided improvement on the tools usually sold for the same purpose.

The writer then went on to describe in detail the various instruments and appliances which had been designed by Mr. Pearsall and himself. Amongst those which he described were the workroom bench designed by Mr. Pearsall, which had the advantage of being much higher than ordinary ones, thus preventing that stooping or bending over work so often seen. By means of a drawer or slide underneath, the various tools were kept ready at hand and the working table free from the pile of instruments usually found scattered over it in all directions.

Concluding, he urged those present to take a deeper interest in these matters, which, he said, would in the end benefit them.

The PRESIDENT, Mr. Booth Pearsall, Mr. J. Smith-Turner (London), and Mr. Rodgers (Wexford) discussed the various instruments and appliances mentioned in the paper.

The PRESIDENT announced that a message had just been received from Mr. Geo. Clarke, President of the Dental Society of New

York, inviting the attendance of the members of the British Dental Association at the annual meeting of the Society in Paris, on the 22nd August next year.

#### THE WORKROOM SECTION OF THE MUSEUM AND ITS CONTENTS.

By G. M. P. MURRAY, L.R.C.S.I. (Dublin).

The lessons to be learnt from the unique collection of ancient and modern denture in the adjoining room will amply repay thoughtful study.

There are to be found specimens ranging from the archaic "bone age" of mechanical dentistry, through the sets of natural teeth obtained from the dissecting-room and the body snatcher, the early home-made mineral teeth, that filthy and disgusting substance celluloid, to the later developments of cheoplastic and continuous gum work.

The workroom section contains what I may call a suite of workroom furniture, whose hygienic principles should command them to those who toil at the bench or are careful for those whom they employ.

A man of literary pursuits, who spends long hours in writing, will have a desk at which he can stand while working, and so relieve his muscles and expand his chest by change of posture. The artist will stand at his easel, and the artisan at his labour. Why, then, should he who is employed at the minute and absorbing work of mechanical dentistry be condemned to sit with contracted chest and bowed shoulders, a position which most of our workroom benches necessitated.

The high bench shown in Section IV. conveys a practical hint to those anxious to improve the conditions under which they work.

I would also draw attention to the proposed arrangement of tools under the bench and ready to the hand of the operator, while the space usually littered with pliers, files and sculptors is kept clear and open for the work itself. •

What ingeniously devised dust traps most of us have arranged round our workroom walls, where the models of succeeding decades are stored on narrow shelves gathering continually dust, dust, and still dust, which, though innocent-looking enough in its ever-deepening repose, might not come with unblemished reputation out of the searching ordeal of a microscopic examination. A strongly made serviceable model cabinet, such as may be seen outside, besides

its convenience for reference, would do much to improve the atmosphere of our rooms.

The lathe, with its powerful driving wheel and leather band, which will be found set up upon the bench, will repay study and reflection; and I would draw attention to the ingenious use to which old polishing brushes are put to moisten and keep clean the corundum wheel and prevent splashing.

There are also to be seen wooden bins for the storage of plaster, in which it is claimed the material keeps better and is more easily drawn off, and with tins.

Two operating stools are sent in for exhibition, one running on castors and attached to the wall by a jointed arm, and the other with a bicycle seat upon a rocking stand, and, lest between these stools we should come to the ground, the workroom stool can also be used beside the chair.

Mr. KIRBY, L.D.S.Eng. (Bedford), read an interesting and instructive paper on "Amalgams."

The PRESIDENT congratulated Mr. Kirby on his persevering and exhaustive investigation of the properties of amalgams. He was quite sure that Mr. Kirby would at a future period be able to give them an amalgam possessing all the properties which they could desire.

Mr. LLOYD WILLIAMS said that up to last year he might say he had no confidence whatever in amalgam, but he had adopted the method of Mr. Kirby, and he must say he found it most satisfactory.

#### IMPLANTATION OF TEETH.

By GEORGE CUNNINGHAM, L.D.S.Eng., B.A.Cantab., D.M.D. (Cambridge).

The writer read abstracts of his paper, and exhibited a patient upon whom he had operated with most satisfactory results. The patient was a young barrister, æt. twenty-three, who had lost his first upper left bicuspid. Dr. Cunningham also exhibited some beautifully prepared and carefully executed diagrams, illustrative of the various points mentioned in his paper. It is much to be regretted that time was not given to the writer to give his paper in detail. Below will be found the most interesting portions. He said: By implantation is meant the drilling of artificial sockets in the maxillary bones, and the insertion therein of natural teeth of suitable size and form. This operation, which is essentially one

of "yesterday," is often described as nothing new, simply from the failure to differentiate it from cognate operations of replantation and transplantation.

Without endorsing Dr. Younger's contention that the factors which tend to the destruction of the root in replantation and transplantation are necessarily absent in implantation, we must admit the conditions and the circumstances are not identical, and that the new operation merits careful and scientific investigation at our hands.

The first account of Dr. Younger's method of implantation contained more or less facetious allusions to his keeping a stock of live teeth in the combs of innumerable roosters. The incredulous, if not the absolutely scoffing, journalists thereupon treated the affair as a huge joke, and drew vivid pictures of the "Californian Cocks' Comb Tooth Supply Association, Limited." From Dr. Younger's own publication the fowl facts seem to be as follows: In his endeavour to prove that the operation of transplantation could be made a success, he determined to repeat the experiment of John Hunter, who, to test the vitality of the pericementum, planted a tooth in a cock's comb with this difference, that he took the precaution of removing the pulp and filling the pulp chamber and root canal with Hill's gutta percha. The success of the experiment satisfied him that "the pericementum would attach itself to any vascular body, and that, if properly planted in a fresh socket, it would attach itself and form a living union with the surrounding tissues."

Dr. Younger, in his first paper, gives an account of his first seven cases of implantation, but no mention whatever is made of the teeth having passed through an intermediate stage in the comb of the cock. Where the history of the scion tooth is given at all, it appears to have been out of the mouth only a few hours, and sometimes only the time necessary for its preparation.

Mr. Cunningham then quoted extracts from Dr. Younger's second paper, read before the California State Dental Association, on "The Implantation of Teeth and Pericemental Life," in which he (Dr. Younger) announced his discovery that the vitality of the pericementum of long extracted teeth may be resuscitated by implantation. This inherent vitality Dr. Younger compared to seeds in plants. He maintained that he had equal success in implanting long extracted teeth, or what may be shortly defined as "dry" teeth, as with those that are fresh, or what may be described as "live" teeth.

Next Mr. Cunningham read the method of Dr. Younger's



operation as described in the DENTAL RECORD of November, 1887, Vol. VII., pp. 499—501, also December, 1887, pp. 542—544. Proceeding, he said: After deciding to adopt the operation of implantation, the first question one has to determine is whether it is better to employ dry teeth which have necessarily been out of the mouth for some time, or those still invested with a live periosteum, as in teeth recently extracted. The question of procuring the requisite teeth soon becomes a very serious and difficult one for the individual operator, and there can be no question that, from the point of view of supply, the feasibility of employing dry teeth may solve an insurmountable difficulty. The desire and hope of the operator is to procure a true physiological union rather than the mere mechanical retention of the scion tooth in the artificial socket, and for a variety of reasons the employment of teeth with a live pericementum, though presenting infinitely greater difficulties in the way of supply, would seem to offer better prospects of attaining that end.

While most of our American *confrères*, therefore, have followed Dr. Younger's later practice in implanting dry teeth, I have deemed it better to revert to his earlier and, I think, better practice of employing only those with a live periosteum.

It must be admitted, too, that the use of teeth with a live periosteum necessitates much greater care in the handling of the scion teeth during the process of preparation, as well as exacting a considerable expenditure of time when it may be ill afforded, since the dry specimens are prepared at one's leisure. It is also easier to have a much larger choice of dry than moist teeth, a point of considerable importance, since the space to be filled may be either abnormally wide or inconveniently narrow. As the first appearance of the implanted dry tooth is extremely unsightly and unnatural, the use of the moist variety is attended with no disadvantage as to colour. Of course, in the insurmountable absence of such a tooth, I would not hesitate to use one of the dry variety, since, whatever may be our theory as to the process of retention, there is no doubt as to the fact that a large number of such teeth are doing good service after a sufficiently long period of trial.

Mr. Cunningham read notes made by him in seven cases of implantation of live teeth. In case No. III. he exhibited the patient, and the remarks made by him (Mr. Cunningham) on this case were as follows: Case III. was that of a healthy young barrister, aged 23 years,

who had lost his first upper left bicuspid in October, 1884. The absorption of the alveolus was therefore quite complete, and the gum normal and healthy. The scion tooth was a left upper second bicuspid from the mouth of a healthy young lady, age 30, extracted in order to prepare the mouth for an artificial denture the same day (2nd December, 1887). The root canal was filled in the usual manner, while the distal cavity was filled with amalgam and a cavity in the crown with gold. The periosteum seemed fairly healthy, but only covered about two-thirds of the root. During the three hours the scion tooth was out of the mouth, it was kept moistened by a mercuric chloride solution one in 1,000. It fitted loosely into the artificial socket and was fixed with a gold splint secured by phosphate cement. On the following day I refixed the splint in a way which further conduced to the comfort of the patient. The gum was slightly congested, but no pain was felt except on pressure of the implanted tooth, which was loose but not "wobbly," as immediately after implantation. No further treatment was necessary. The splint was retained for about five weeks, when it was removed and the tooth found to be fairly firm. As it is usually supposed that the operation is a painful one, the following notes of the operation from this point of view, jotted down by this patient at the time in his own words, may not be without interest:—

"Stage 1. Lancing gum and detaching periosteum from the bone—pain not very great.

"Stage 2. Making the socket; very little pain at first, but it materially increased as the operation progressed.

"Stage 3. Implantation, &c.; no pain. On the whole I had far less pain than I expected, and what pain I had, though sometimes severe, was never acute. There was none of that thrilling pain incident to the boring a tooth."

The patient is so far satisfied with the operation that he intends very shortly having the corresponding tooth on the other side, which has also been lost for several years, replaced by a similar operation.

Mr. Cunningham next pointed out the danger of penetrating the antrum, which, he said, occurred in one of his own cases, but without any disastrous results. Speaking of the processes of repair, Mr. Cunningham said: The pericementum, so far as vitality is concerned, has no special characteristics which differentiate it from any other connective tissue of the body, and it is, therefore, extremely improbable, if not impossible, that it should possess this so-called

property of adherent vitality. If the protoplasmic part of the pericementum can exhibit this remarkable property, why not the protoplasmic contents of the cemental lacunæ and the dentinal tubuli?

Speaking of the different methods to be employed, he said the instruments specially adapted to the operation are already somewhat numerous, including the "Younger trephine," the "circular knife of Rollins" and the "crib knife of Ottoby." The pain dependent on the operation is, no doubt, greatly due to the nature of the instrument. From my own limited experience, I think the easiest plan consists in boring a small hole, representing the axis of the new socket, and then enlarging rapidly, cutting bone reamers with a guiding point to follow the first perforation. Instead of a sliding guide, as in the Younger instruments, to indicate the depth of the socket, I have had the drills graduated, which serves the same purposes and effects a saving of time.

Speaking of the medium for the scion tooth, Mr. Cunningham said: As it is not always practical to at once transfer the scion tooth to its new socket, and as the tissue no doubt does retain its vitality for an as yet unascertained limit of time, it is advisable to have some medium in which to keep the tooth moist and possibly aseptic. One naturally turned to those so-called normal fluids employed in the physiological laboratory, since, when fresh, they are said to cause very slight change in the tissue, as they more or less resemble the fluids with which the tissues in the body are surrounded.

The fluids are:—

- (a) The aqueous humour of the eye;
- (b) Blood serum;
- (c) Normal saline solution;
- (d) Iodized serum.

Consulting Mr. Langley, the well-known physiologist, he advised me rather against employing any of these, but rather to keep the teeth in plain water at a temperature just above freezing point, as being most likely to prevent tissue and septic changes.

That, so far, the operation is practically a success, though it is as yet premature to measure that success in years. That the operation is only capable of limited application; but in these special cases, where it is applicable, the implanted tooth fulfils its function better than any other remedial treatment known in dentistry.

The PRESIDENT said he was unable to command language

sufficient to express the feelings he entertained for the communication made to them by Mr. Cunningham. They were proud of his presence amongst them, and he only regretted that the time at their disposal would not admit of the discussion to which the paper was entitled.

The discussion on Mr. Cunningham's paper was carried on by Mr. Woodhouse, Mr. Theodore Stack, Mr. Street, Mr. Capper, Mr. Baldwin, and Mr. Rodgers. Mr. Cunningham having replied, the business of the meeting concluded.

After the meeting a large number of members proceeded to the Art Exhibition in Molesworth Hall, where they, with their friends, were entertained at an afternoon tea. This exhibition of pictures was one of the attractions connected with the meeting of the Association. The pictures were exhibited by members of the Dublin Art Club and the members of the British Dental Association. To describe or even mention in detail the various works exhibited would be to engage in a work we would not have space to give, but we may mention one or two by members of the Association, which struck us as deserving of praise. "An Innishown Shore," by Mr. William Booth Pearsall; "On the Dutch Coast," by Dr. John Smith; also those by Messrs. Charles Tomes, J. Howard Mummery and Alfred Prager.

The idea of the exhibition, apart from its own intrinsic usefulness, was a most meritorious one, viz:—To raise funds for the Dental Benevolent Fund, by means of a lottery. This resulted in nearly £70 being handed over to this deserving fund.

#### THE CONVERSAZIONE.

On Friday night the members of the Reception Committee entertained the members of the Association, together with a large number of friends, at a *Conversazione* in the Royal College of Surgeons. To say that the affair was a brilliant success would but feebly bear testimony. Not for some time past has such a fashionable and brilliant assembly been held in Dublin. The invitations issued were numerous, and an idea of the assemblage will be gathered when we state that over nine hundred invitations were accepted, these including members of the learned professions, the leading gentry, merchants and traders of the city. There was a good number of members of the Association present. Shortly after nine o'clock the guests began to assemble in the large hall of the College. The



gallery was reserved for promenading, and the museum was thrown open, where those who were of a scientific disposition could spend an hour in an agreeable and profitable manner. The band of the Royal Irish Constabulary supplied the music, and upheld the high name and reputation which it justly bears. Not the least enjoyable portion of the musical programme was the various selections rendered by the members of the Dublin Quartette Union.

On Saturday morning the members and their friends, to the number of 150, were conducted in parties of twenty each over the world-famed brewery of Messrs. Arthur Guinness, Son & Company.

The first party started punctually at 10 o'clock under the guidance of Mr. Shaw, one of the resident engineers of the firm, who courteously explained the different points of interest connected with the establishment. The parties were conveyed from the upper to the lower brewery by means of one of the Company's pretty little trains, which travel through a spiral iron tunnel about one-quarter of a mile in length.

Leaving Guinness's, the members wended their way to the Amiens Street Terminus, where a special train was in waiting to convey the members and their friends to the pretty, but much neglected watering-place, Howth. Punctually at 12.40 the train with its living freight, under the parental care of Dr. Theodore Stack, steamed out of "dear dirty Dublin," and in a short space of time arrived at its destination. The party, which numbered upwards of 200, divided themselves into two groups, one proceeding on foot to the Pavilion, through the beautiful grounds of the Earl of Howth, the other going the longer way round the coast, in waggonettes, which were in waiting. Those who went on foot had an opportunity of seeing the castle, while those going by way of the coast were afforded an opportunity of admiring and examining the ruins of the old abbey.

When both parties had arrived at the Pavilion, a sumptuous lunch was served, after which an interesting address was delivered by Mr. J. R. Whigham, M.R.I.M., on "Gas in Lighthouses," to whom a hearty vote of thanks was accorded. The party were then taken to the Bailey Lighthouse, where Mr. Whigham courteously explained the mechanism of same. The party then drove back to town in waggonettes, and thus terminated, without hitch or flaw, the first meeting of our Association on Irish soil.

## THE ANNUAL DINNER.

On Thursday evening, the members of the Association dined in the large hall of the Royal University. Upwards of two hundred sat down to dinner, and quite a number of ladies occupied seats in the balcony. The hall was tastefully decorated. In front of the dais, worked in a neat and pretty manner in embroidery, were the names of the places in which the Association has held its annual meetings since its formation.

Mr. DANIEL CORBETT, M.R.C.S., L.D.S.Eng., presided.

After dinner,

The PRESIDENT gave the toast of "The Queen," which was received with enthusiasm.

It was announced that the following telegram had been received from Sir E. Saunders:—"I am drinking the health of the genial president, the indefatigable secretary, and success to the meeting."

The CHAIRMAN gave the toast "The Army and Navy," and Major RODGERS (Cheltenham) responded.

Mr. W. BOOTHE-PEARSALL proposed "The Press," which was responded to by Dr. A. H. JACOB (Dublin), Editor of the *Medical Press and Circular*. He said that a toothless journal would, in the present day, speedily pass from public recognition. Newspapers in this stirring period through which they were passing must have their teeth properly set and sharpened for the struggle which was fiercely waging round them. It was a proof of the growing importance of the dental profession that many organs of public opinion were now giving prominence to dental matters. He thanked the friends of the Dublin Press for permitting him to respond on their behalf. He hoped the future history of the Association would be one of growing prosperity.

Mr. A. S. UNDERWOOD, Editor of the *Journal of the British Dental Association*, also responded.

Dr. GEORGE H. KIDD (Dublin), proposed "The British Dental Association." He said the members of that Association had done much to advance their profession in public estimation, and he felt that that in itself was a sufficient warrant for calling upon them to drink to the health of the Association. When the Association first undertook the task of raising their body to the rank of a literary and learned profession he took a deep interest in that proceeding. The surgeon required to be learned in medicine, and no good man could be a good physician who was not versed, at all events, in

surgery. In the same way no man was fit to be a dentist who was not a student of the science of surgery and medicine.

Mr. MORTON SMALE, Hon. Secretary of the British Dental Association, responded. He did not entirely concur in Dr. Kidd's observations. He thought rather that a man should be a dentist first and surgeon afterwards. The dentist's curriculum was rather an extensive one. There was first of all a preliminary examination and then there was a special curriculum in dentistry. The student was then required to spend three years at the mechanical part of the work, two years in a general hospital, and two years in a dental hospital. He thought that was a good curriculum. During the two years that the student spent in the general hospital he was obliged to study anatomy, physiology, chemistry, materia medica, medicine and surgery. In conclusion, he wished to add that he and the members of the Association would long remember the cordiality of the reception accorded to them in Dublin.

Mr. J. SMITH-TURNER (London) proposed the "Universities and the Royal College of Surgeons." He said that the Dublin College and Universities enjoyed a wide reputation, and their graduates and students ranked amongst the ablest men in the various professions throughout the world.

Professor J. T. BANKS (Dublin), responding for the Universities, said he did not know any city where the members of the Dental Association would receive a more cordial greeting than they might always expect to meet in Dublin. He had long honoured the profession of dentist, and when he said that the Association would always be welcomed in Dublin, he should have added that that welcome would spring to a large extent from the fact that members of the dental profession in Dublin enjoyed a deservedly high reputation.

Dr. FITZGIBBON (Dublin), said he regarded dentistry as a very important branch of the surgical profession. In Ireland, dentists were found to be men of high culture and of high social qualities. He believed that the dental branch of surgery would gradually grow in importance and in public esteem.

Mr. DENNANT (Brighton), proposed "Our Visitors," which was responded to by Mr. T. BALIE-GAGE.

Mr. C. S. TOMES (London) gave "The Health of the President," which was duly honoured, and the company separated.

### GOSSIP.

IN the alimentary canal of the leeches, the muscle-fibres are placed both longitudinally and circularly. They consist of a contractile sheath and a protoplasmic axis containing the nucleus, and either have pointed ends or else divide into two or more branches, each of which ends in a point. The muscle-fibres are separated by large interstitial spaces filled with connective tissue in which the nerve plexus lies and sends fine nerve branches into the muscle-fibres. The nerves end, says Dr. Heymans, partly as extremely fine filaments and partly as round flattened end plates. In this subject there is some interesting work for the micro-anatomist.

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THE decorative ideas expressed in the monuments of the ancient inhabitants of Central America have close resemblance to carvings executed by Indians of the North-West Coast of America, and by the people of the Pacific Islands; hence, says Baldwin, the seeds of this ancient civilization were brought from the East Indian Archipelago from island to island across the Pacific, and finally reached the American Continent. It was prevented by the chain of Cordilleras from going further eastward.

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PROFESSOR ELIHU THOMPSON (U.S.A.) states that he has observed as many as six lightning flashes very quickly following each other along the same path. M. Trouvelor, during a storm, succeeded in obtaining a photograph of a flash of lightning, which showed that the flash was divided into four main branches, which were brilliant and well defined, with several others which were so faint that they could only be seen by the help of a lense. A microscopical examination of the image shows it as a long ribbon, seemingly traversed vertically by a multitude of rays more or less close together and more or less brilliant, corresponding in general with the fracture of the zigzags which seem to make up the flash. Probably the photograph has disclosed fully the appearance seen but imperfectly by the eye of the first observer.

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AN astronomical observatory is about to be erected at Pekin.

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A NEW base has been discovered in tea by Dr. Kossel, of Berlin. It appears to be an isomer of theobromine, the well-known base present in cocoa beans, but differs from it materially in physical and chemical properties.

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THE remains of several prehistoric canoes have been found on draining some upland lakes in Central Sweden. They were made by hollowing out the trunks of trees by fire. One was full of stones, with which it had probably been sunk.

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PROFESSOR LANGLEY, in his "New Astronomy," says:—From recent measurements it appears that from every square yard of earth exposed perpendicularly to the sun's rays, in the absence of an absorbing atmosphere, there could be derived more than one horse-power, if the heat were all converted into this use, and that even on such a little area as the island of Manhattan or that occupied by the city of London the noontide heat is enough, could it be utilised, to drive all the steam engines in the world.

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QUOTING from the same work, Professor Langley says: During no more than eighteen million years can the present rate of radiation—supposing it fed by the shrinkage through gravity of the sun's substance—have been maintained in the past. We say "present rate of radiation," because, so long as the sun is purely gaseous, its temperature rises as it contracts and the heat is spent faster: so that in early ages, before the temperature was as high as it is now, the heat was spent more slowly, and what could have lasted "only" eighteen million years at the present rate might have actually spread over an indefinitely greater time in the past, possibly covering more than all the æons geologists ask for.

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PROFESSOR MELDOLA announces that he has detected the scent emitted by the male moth *Herminia tarsipenalis*. It has long been known that this insect possessed fan-like structures on the front legs, and it had been surmised that these were secondary sexual character. The detection of the scent now places the functions of these organs beyond doubt. The odour has been recognised as similar of that of artificial essence of jargonelle pear (*Amyl acetate*).

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SOME males of South American butterflies are provided with elaborate scent organs, which give off a distinct odour of vanilla, according to F. Müller.

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THE almost constant presence of the micro-organisms described by Kleb, Pasteur, and others, shows that, they are in all probability the real and exclusive cause of pyogenesis, a conclusion placed almost beyond doubt by the fact that, when introduced into the animal system, these organisms invariably produce suppuration and abscess.—(From "Microbism," by M. Verneuil, before the Paris Academy of Science, September, 1888.)

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IT is evidenced by the writings of Pliny that the conversion of certain oils and animal fats into a saponaceous mass by treatment with the ley of wood ashes was known in the first century.

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THE manufacture of candles with a wick surrounded by solid fusible matter capable of combustion does not appear to have been practised among the ancients. Not until the fourth century of our era does the crude device of torches and the like appear to have developed into anything approaching the modern candle.

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PROFESSOR EWING has lately applied his seismograph to the new Tay Bridge to examine the shaking of the bridge during the passage of a train. The instrument was placed on one of the girders where it was expected the vibration would be the greatest. The extent of the motion was very small, being less than an eighth of an inch, even while the train was passing the seismograph. So sensitive is this instrument, that when a train came on the Dundee end of the bridge, a distance of  $1\frac{1}{3}$  mile from the point of observation, the motion was recorded, although it was not more than  $\frac{1}{500}$  of an inch.

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MR. FOLKARD, the librarian of the Wigan Library, has lately discovered a remarkable tract. It is entitled "An Overture for Founding and Maintaining a Bibliotheks in every paroch throughout the kingdom." It was printed in 1699, without the author's name and place of printing.

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AN apparatus has been invented and patented by J. F. de Silva for making incisions without pain. The instrument consists of a series of geared wheels, which are set in motion by a key. These impart to the knife a single rapid to-and-fro motion, which makes the incision so quickly that no pain is felt. Remarkably like in principle the old scarifier which was used in cupping in the days of blood-letting.

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THE colour of the Fluor Spar, known as Blue John, which is obtained from the celebrated mine near Castleton, has hitherto been stated to be due to the presence of manganese. According to some recent analyses made by Norman Tate, manganese is not present in the mineral, and he has come to the conclusion that the colour is due to hydrocarbon matter, possibly bitumenous elaterite, which occurs in the neighbourhood. In a quarry at Windy Knoll there is found an inferior blue fluor spar with bitumen.

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It is stated in the *Naturforscher*, that Professor Pflüger and Dr. Tilanus have succeeded in cultivating by Koch's method the bacteria which produce the luminosity of sea fish, and further, they have been able to place them upon a glass slide, which in the dark appears thickly strewn with luminous points. Photographs of these have been done by Professor Van Nornan.

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SACCHARINE has considerable power in preventing the decomposition of many animal matters, and may be added to gelatine, gum, and starch solutions, with the same effect as carbolic, salicylic and benzoic acids.

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THE disease known as gapes, to which fowls are liable and which often proves fatal to large numbers of our game birds, notably the pheasant, is the result of a parasitic worm which is found in the air passages and intestines. Dr. Walker, in the "Bulletin of the Buffalo Society of Natural Science," claims to have discovered that the common earth worm is the host of this well-known parasite, *Syngamus trachealis*. These taken as food by the birds will account for the presence of the gape worm in their intestines, but how the parasite makes its way into the intestinal canal of the earth worm has yet to be discovered.

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Two years ago Mr. Castner, of New York, erected at Lambeth some experimental works for the production of sodium and aluminum, and now these metals can be produced at the new works at Oldbury, near Birmingham, one at one-fifth, the other at one-third, the cost previously incurred.

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THE Augusts meteors appeared at heights varying from 43 to 70 miles, and disappeared at heights varying from 28 to 59 miles. The lengths of their real paths were from 24 to 38 miles. This August display furnished a splendid fireball, which was seen simultaneously at Leeds, Dublin, Bristol and Birmingham. Its brilliant streak had a mean elevation of 53 miles and length of 18 miles.

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A TELEGRAPH wire does not convey the pulses, it merely directs them. They are conveyed wholly by the ether which surrounds it as an insulating medium, and this ether does not convey end thrusts or pulse-like sounds, but it conveys transverse vibrations or lateral pulses, like light.

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To the ignorant the people of tropical Africa are animals ; but the eye of evolution looks on them with a kindlier and more instructed sense. They are what we once were ; possibly, they may become what we are now. Willing to work and assiduous while employed, yet they have no incentive to labour. Their wants are but few, and these readily supplied from a soil so fertile that it laughs into a harvest without tickling.—*Professor Drummond's "Tropical Africa."*

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M. G. CARLET has communicated to the Academy of Sciences his results on the study of the locomotion of caterpillars. When creeping they move their feet in pairs. Of these there are seven, and on the end or twelfth ring, of which the body is made up, there are two membranous feet—the anal legs. In some exceptional cases a caterpillar has sixteen legs. If we let a caterpillar creep on a flat slip of wood held on a level with the eye, we can see that its first movement from a state of rest is the detachment of the anal pair, the eighth, which are then brought up to the seventh pair. The prolegs, 4, 5, 6, 7 are then released from behind forward, in the order 7, 6, 5, 4, and are pushed forward by slackening the two



penultimate footless rings, like a spring set loose. This series of progressive movements of the rings arrive like an undulation, at the two anterior footless rings. These rings are compressed by the release of the two hinder footless rings, and the pair of legs 4 are thus brought close to 3. This pair is then raised and in quick succession the pairs 2 and 1.

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THE observations of Augustus D. Waller, M.D., on the electro-motive changes connected with the heat of the human heart, furnish a demonstration of the changes which accompany each contraction of the organ. He states that it is possible, by leading off from various parts of the surface of the body to a capillary electrometer, to observe upon animals and upon man variations of potential coinciding with, and dependent upon, the heart's beat. Photographic records of these variations were presented with the reading of the paper before the Royal Society.

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THE Lick telescope, erected at San Francisco on a masonry foundation which forms the tomb of James Lick, the founder of the Observatory, has an object glass of thirty-six inches diameter. Professor Holden says of this instrument: I have had such views of the planets Mars and Jupiter, of Nebulae, the Milky Way and some of the stars, as no other astronomer ever had before. Jupiter especially is wonderfully full of detail. The discs of his moons are seen round and full, like those of planets. There is reason to believe that these, like our own moon, present always the same face to their planet. Theoretically, Lord Rosse's six-foot reflector should show more than the Lick telescope, but the definition of the latter is far greater. The former shows the ring nebula in Lyra without a central star; the latter shows it with three stars. It is intended to open this Observatory to visitors every Saturday night from 7 to 10 o'clock.

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IN a recent communication to the Chemical Society of Paris, Professor Maumené stated that it is possible to effect the synthesis of all organic compounds by means of a silent discharge of electricity. We do not see from such a statement that he is propounding any new theory, as years ago Dr. Gladstone, in conjunction with Mr. Tribe, demonstrated that many organic compounds could by this means be

produced. The principles involved in their process has the bringing together the elements in such a condition by electro-decomposition that synthesis certainly followed.

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HERR H. EBERT, in *Cosmos*, says: The sensitiveness of the eye for different colours is not identical. It is greatest for green, then follow red, greenish blue, yellow and blue.

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DR. M. C. KELLER, of the University of Zurich, says: In Madagascar an earthworm (*Geophagus Darwini*), more than a yard in length, plays the principal part in the formation of soil. If it be so, it serves to confirm the results obtained by Darwin's experiments.

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THE results of experiments of the best electricians show that a one-candle light maintained by tallow absorbs 124 watts of energy, while the same amount of light maintained by electricity in a glow lamp absorbs only three watts. A watt is  $\frac{1}{746}$  of a horse-power.

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THE researches of Dr. Immanuel Munk show that a small singing bird consumes 11.360 grammes of oxygen, while a hen uses only 1.300 grammes, a cockchafer 1.019 grammes, a horse 0.563; a sheep 0.490. From these it will be seen that smaller animals, as a rule, have a greater intensity of respiration than larger ones. In singing birds the intensity is very remarkable.

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FISHES have been dredged from a depth of 2,750 fathoms, where the amount of oxygen is about 300 times less than that of arterial blood. Yet the blood of the fish contains much more oxygen than exists in the same volume of sea water. Whence, then, do these deep-sea creatures obtain the oxygen? Probably by a method of storage, as Biot found in the swimming bladder of such fishes 70 volumes per cent. of pure oxygen in which a glowing splinter of wood was relit.

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ONE of the most famous cartographers of Europe was Johann Schöner. He was the Professor of Mathematics of Nuremberg in

the early part of the sixteenth century. He was the author of three globes, which he constructed in 1515, 1520 and 1553. All these are preserved at Frankfort, Nuremberg and Weimar respectively.

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FROM the combined observations of Pickering, Langley and Smith and others, it appears that the total light of the corona in the eclipse of 1878 was 0.072 of that of a standard candle at 1 foot distance, or 3.8 times that of the full moon, or 0.0000069 of that of the sun. From the photographs taken during the eclipse, it appears that the coronal light varied inversely, as the square of the distance from the sun's limb. In the eclipse of 1886 the coronal light was only 0.0124 of a standard candle at a distance of 1 foot. In explanation of this difference in luminous intensity, the eclipse of 1878 was not very far removed from a period of maximum disturbance, whereas in 1886 we were approaching a period of maximum disturbance.

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So sensitive are the glands on the leaves of the common sundew, *Drosera rotundifolia*, that an organic object weighing only  $\frac{1}{78740}$  of a grain placed on them is sufficient to cause motion, yet they are insensible of the weight and repeated blows of drops of heavy rain.

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Two dental graduates of American colleges—Pennsylvania University and Boston College—were prosecuted in London on August 14th and 21st, and find £5 and costs for implying that they were specially qualified to practice dentistry in the United Kingdom. Notice of appeal was given.

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THE *Illustrated Medical News* is the title of a new periodical.

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THERE is reported in the Auckland newspapers, for July 27th, a case of death from erysipelas and gangrene of the face and eye after the extraction of a tooth by an itinerant quack, who operated in a "golden chariot" before a crowd of onlookers.

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THE Annual Circular of the *Medical Directory* has just been issued. Licentiates in Dental Surgery should see that their names, &c., are not omitted from the forthcoming edition for 1889.

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It is understood that Mr. Henri Weiss has been appointed, *pro tempore*, Dean of the National Dental College, in succession to Mr. Gaddes, who is about to take up his abode in America.

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DR. PAUL GIBIER, who was deputed by the French Government to investigate the whole question of yellow fever, has just delivered a lecture before the Academy of Sciences in Havana, embodying the results at which he has at present arrived. His opinion is that yellow fever is due to the development of the microbe in the intestine, the affection being therefore essentially a local one. The examination of the blood taken from the heart in these cases, as well as the inspection of the urine, the bile, the pericardial fluid, the liver, the spleen, and the mesentric glands, convinced him that none of these organs contain any microbe. He, however, discovered in the black matter always found in the intestines a bacillus presenting many points of resemblance to the so-called comma bacillus of cholera, being sometimes curved, and occurring in some cultures in a spiral form, possessing also the property of liquefying gelatine.

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THE Annual Dinner of the Past and Present Students of the National Dental College will be held on Friday, October 19th.

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REGARDING the presence of the superior incisors and canine teeth of sheep, Dr. Florence Mayo, of Harvard College, draws the following conclusions from the study of a long line of cross sections :

(1.) "That in the embryo sheep at a certain age of development the dental lamina exists throughout the canine and incisor regions of the upper jaw. Its anterior portion, which is *last* to develop and the first to abort, does not attain so prominent a condition as its lateral portions. After advancing in development for a time, it retrogrades, and finally disappears.

(2.) "That in the canine the dental lamina gives rise to an enamel germ which never reaches a stage of functional activity, for neither are its central cells transformed into a stellate reticulum, nor do those of the malpighian layer ever produce enamel, and in later stages both disappear.

"In this region there is no trace of a dentine germ. The fact of the existence in sheep of rudiments of such organs as usually result in the formation of teeth is of interest, because it is one of those



peculiar structures for which it is difficult to account without the aid of the theory of natural selection. From the observations here recorded, one readily sees that the disappearance of the superior incisors and canines is progressive. In the region of the incisors the evidences even of the beginnings of tooth development have almost disappeared, the region of the first incisor being the least differentiated portion of the tract, while the canine region is represented by a moderately large but functionless enamel sac. Since, in some ruminants destitute of incisors, small rudimentary canine teeth are found on the upper jaw of the adult animal, it is a fair inference that the teeth are being lost from before backward, and that the canine teeth, the last to disappear from the sheep, are in such cases undergoing degeneration, although not wholly functionless.

"If it is admitted that the history of the development of the individual reproduces, at least in part, the history of the ancestors of that individual, and that the changes in development take place in the same order as in the ancestors, then we have reason for believing that the progenitors of the ruminants possessed incisors and canine teeth on the upper jaw; that these teeth becoming, perhaps by a change of environment, no longer necessary for obtaining food, have gradually ceased to develop, and that the disappearance of the teeth has been a progressive process, beginning with the middle incisors and gradually involving the teeth farther back."—*Independent Practitioner*.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, and at the Manchester Dental Hospital, from August 1st to August 31st, 1888 :—

					London.	National.	Victoria.
Number of Patients attended ...					—	2507	1134
Extractions	Children under 14	...	...	...	525	388	667
	Adults	...	...	...	1,140	641	
	Under Nitrous Oxide	...	...	...	807	798	
Gold Stoppings	...	...	...	...	95	41	15
Other Stoppings...	...	...	...	...	358	395	134
Advice	...	...	...	...	176	450	—
Irregularities of the Teeth	...	...	...	...	42	53	—
Miscellaneous and Dressings	...	...	...	...	182	172	410
Total	...	...	...	...	3,334	2,938	1,313

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INVESTIGATIONS ON THE PATHOLOGY OF  
ABSCESSUS APICALIS.\*

By DR. ARNIM ROTHMAN,  
(Assistant in the Budapest Dental Institute.)

(Translated by Geo. Cunningham, B.A., D.M.D., L.D.S.)

By "Abscessus apicalis" we understand a purulent inflammation of the apical part of the periosteum, which Wedl describes as follows:—"Inflammation of the closed extremity of the periosteum of the tooth, with suppuration in the inner layers of tissue, sometimes occurs, giving rise to the formation of a *spherical sac* of pus, which may attain the size of a small pea. As is well known, it is not an uncommon occurrence, when the affected tooth is extracted, to find the sac unbroken, and attracted like a berry to the apex of the root." According to Hulme, sacs of this kind very rarely result from an *acute*, but almost invariably from a *chronic*, inflammation.

Malassez attributes to the embryonal cells of the enamel organ (*débris épithéliaux paradentaires*) an important part in the development of these formations, and describes them under the name of "Kystes radiculo-dentaires."

From these forms, which enclose a pus containing cavity, Wedl distinguishes those which have also spherical forms, and occur on the apex of the root, but in whose interior no cavity is present. These latter forms are described also by Malassez under the technical expression of "Fongosités radiculo-dentaires," and are therefore placed in a separate division.

The classification of Arkövy differs from that of Wedl in so far

\* This essay, originally published in the *Oesterr.-ung. Vierteljahrsschrift für Zahnheilkunde*, is a chapter taken from a work on "The Histology of Diseases of the Pulp and Periosteum," by Dr. Arnim Rothman, which was awarded a prize and highly commended by the Royal University of Budapest, and will shortly be published.

that it regards, on clinical grounds, the abscess as an acute inflammation, accompanied by suppuration ; while the cases regarded by Wedl as "sub-acute" or "chronic," are regarded from a clinical aspect as "Granuloma" or as "Periodontitis chronica apicalis," and are identical with the "Fongosités radiculo-dentaires" of Malassez.

My histological investigations justify Arkövy's classification in so far that the microscopical description of "*Abscessus apicalis acuta*," with which only we are now concerned, coincides in many details, such as the layers of the abscess wall, with that form which Wedl regards as characteristic of chronic cases ; and, on the other hand, that those formations of the apical part of the root membrane, which are solid and do not enclose a cavity filled with pus, are histologically so different from *abscessus apicalis* that they cannot by any means be regarded as cases of "*abscessus apicalis*," in which the wall has been thickened, and the pus been absorbed ; hence we must assume that, corresponding to the various causes (pulp disease) which produce these two forms of disease of the root membrane, the patho-histological alterations at the apex of the root assume different forms.

We believe, therefore, we are justified in describing as "*abscessus apicalis*" only such spherical or oval sacs of pus which occur at the apex of the root, and are accompanied by symptoms of acute inflammation. Those tissue alterations at the apex of the root caused by chronic inflammations, which have nothing in common with an abscess, must be regarded as "*periodontitis chronica apicalis*."

Wedl distinguishes in the sac of *abscessus apicalis*, and certainly in those places where the walls are thick, the following three layers :—

(a.)—An external, thicker, more resistant layer, in which cells of an oblong shape, imbedded in a fibrous stroma, predominate ;

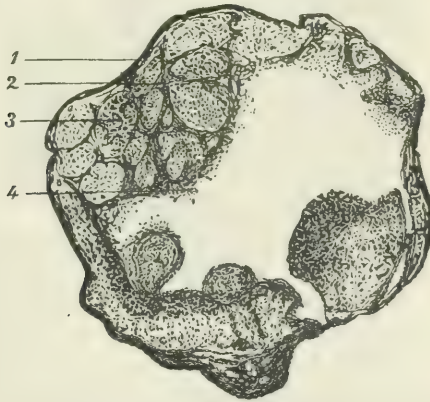
(b.)—A middle, less firm, more spongy layer, containing mostly rounded, nucleated cells in a felted mass of filaments, arranged in parallel rows or in irregular clusters ;

(c.)—An internal layer, a sort of granulation tissue, with pus adherent to it.

Malassez gives, under the name "*Kystes radiculo dentaires*," a close description of *abscessus apicalis*, as well as a comprehensive review of the literature referring thereto, and mentions also all the theories propounded as to the origin of these formations. The description of Malassez agrees with that of Wedl so far as regards

the two outer layers of the abscess wall. The inner layer, however, he holds to be epithelial cell tissue, and asserts that what he calls the "*Débris épithéliaux paradentaires*," which are normally present in the root membrane, extend by proliferation to the inner side of the root membrane; so that between the cementum and the root membrane are found one to two layers of epithelial cells. These *epithelial cells* detach themselves from the cementum, and, while they remain adherent to the inner surface of the periosteum, they conduce to the formation of the abscess wall, which thus consists on the one hand of the two external layers from the tissue of the root membrane, and on the other hand of the layer of epithelial cells, which covers the inner surface of the root membrane. This epithelial layer also forms in the walls of the abscess outward, extending trabeculæ. I cannot now enter into particulars upon the extensive illustrations of Malassez, but rather refer the reader to his work bearing on this subject, page 32.

It is, however, necessary to briefly remark that Malassez regards the development of "*abscessus apicalis*" as arising from embryonal

FIG. 1 *a*  $\frac{1}{10}$ 

## DESCRIPTION OF PLATE.

Fig. 1.—Abscessus apicalis.

(a) Transverse section of abscess: (1) The outer layer, (2) the trabeculæ of the middle layer, (3) the stellate cells between the trabeculæ, (4) adherent pus.

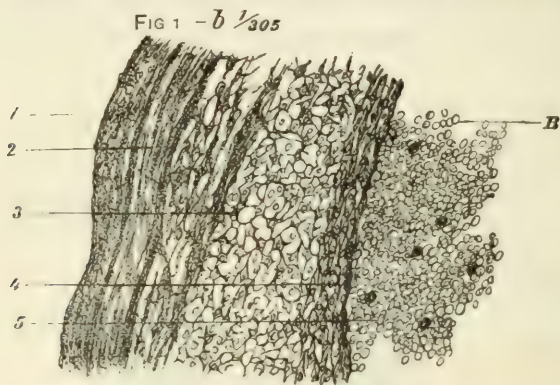
germs, which are the remains, partly of the enamel organ, partly of the epithelial cells of the gingiva. These embryonal germs may under certain circumstances, as already described, proliferate, and so give rise to an abscess formation, which thus, so far as development



is concerned, presents a similiarity with the already well-known parovarian cysts which are often objects of surgical interference. My investigations, which comprise five apposite cases, do not justify by their results the statements of Malassez. In one of these cases, however, I did find epithelial cells, but the case itself could not be regarded as a simple abscessus apicalis, since (as I shall further describe) I had not to do with an abscess in this case, but with a multilocular cyst. In the four other cases examination proved, on the contrary, that they were *not* cysts, but true abscess formations, and products of the inflamed periosteum, in which I was unable to discover any epithelial cells.

Fig. 1, *a*, shows the transverse section of an abscessus apicalis attached to an upper first molar, which was also affected with *Gangraena pulpæ totalis humida*.

The abscess was the size of a pea; its wall, in some parts,  $1\frac{1}{2}$  mm. thick, in others only  $\frac{1}{2}$  mm. In these thinner places three



#### DESCRIPTION OF PLATE.

Fig. 1.—(*b*) A part of the middle layer of the abscess wall, showing trabecular structure (2 and 3), same as in (*a*).

layers were always distinguishable (Fig. 1, *c.*), namely :—An external layer consisting of spindle-shaped cells; an intermediate, round-celled, but not always uniformly thick layer, and an inner, moderately broad layer, also consisting of spindle-shaped cells, but in which the intercellular substance was formed of less compact fibrous tissue than that present in the external layer. Adherent to the inner layer was found a small strip consisting of dried-up pus. In the thicker parts of the abscess-wall, the outer and inner layers—consisting of spindle-shaped connective tissue cells—were also

distinguishable, but the intermediate layer presented considerable differences. The latter appeared (under a low magnifying power) to vary in thickness, and seemed to be divided into little islands by means of fibrous filaments. These fibrous filaments were continuous with the inner spindle-shaped cell layer, whilst the islands enclosed by the fibrous filaments proved to be cells with small nuclei (Fig. 1, *a*).

Under a higher power these fibrous filaments assumed the form of spindle-shaped connective tissue cells, closely packed together in rows, and the trabecular appearance was evidently due to their being so closely grouped together. The islands, on the contrary, resembled a very beautiful wide-meshed adenoid connective tissue (Fig. 1 *b* and Fig. 2). With the exception of the multicular cyst already mentioned, the patho-histological features were identical in all the other cases of abscessus apicalis.

I was familiar with Malassez's work prior to my investigation of the first cases of "abscessus apicalis," and therefore searched with much care for the epithelial cells mentioned by him.

Under a magnifying power of 305 diameters, I could not easily determine whether the cells forming the fibrous filaments were epithelial or connective tissue cells, as the protoplasm stained yellow and the nuclei red with picro-carmin, thus giving the idea of epithelial cells; but a magnifying power of 690 diameters made the matter clear, for, as is shown in Fig. 1 *b* and Fig. 2, the fibrous filaments were clearly proved to consist, not of epithelial cells, but of spindle-shaped and stellate connective tissue cells with fine processes.



#### DESCRIPTION OF PLATE.

Fig. 1.—(c) A part of the middle layer without any trabecular structure, (1) outer, (2) middle, (3) inner layer, (4) adherent pus.

From the results of investigation, we may also assert that "abscessus apicalis" in most cases is not a neoplasm arising from an increase of embryonal germs, but is produced by an inflammation which has developed under the same conditions and from the same

cause as "periodontitis acuta purulenta diffusa," extending over the entire periosteum of the tooth. The reason why the pus forms an abscess at the apical part of the root, and does not infiltrate the tissue of the periosteum, as is usually the case in purulent diffuse inflammation, is because the periosteum is considerably thicker at the apical part of the root than at any other part, and in consequence of this the pus formed, instead of infiltrating the tissue of the periosteum, detaches it from the tooth, and thus produces the abscess.

*(To be concluded.)*

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### **ON SOME PRACTICAL POINTS IN CONNECTION WITH THE CHEMISTRY, PHYSIOLOGY AND PATHOLOGY OF NITROUS OXIDE.**

*(Being a Lecture delivered in the Post Graduate Course at the National Dental Hospital, July 13th, 1888.)*

By J. FREDERICK W. SILK, M.D.Lond.

*(Anæsthetist to the Hospital and to the Great Northern Central Hospital).*

GENTLEMEN,—I would premise my remarks by hoping, that you will at once dismiss from your minds the idea that I have anything new, much less anything original, to communicate. I am induced to adopt the commonplace, because I believe that the importance of systematic teaching in the theory, as well as in the practice of anæsthetics, is not sufficiently recognised at either our Medical or Dental Schools. The student, in due course, becomes a qualified practitioner, either of medicine or dentistry, but in consequence of the omission referred to, he is, in nine cases out of ten, fully persuaded that the administration of anæsthetics generally, and of nitrous oxide in particular, is a mere question of rule of thumb. In after years he probably comes to the conclusion that this is not really the case, and, as your presence here to-night would seem to indicate, he may desire to obtain more accurate information ; but he then discovers that the literature of the subject is so scattered, as to render this task one of great difficulty, and requiring more time than the average busy practitioner can afford. I wish this evening to point out to you, some at any rate, of the important points in connection with nitrous oxide anæsthesia, and to show you, that in many particulars the methods of administration which my colleague, Mr. Davis, will subsequently demonstrate to you, are founded quite as much upon theoretical considerations and logical deductions, as upon mere haphazard experience. A few

words first as to the chemistry of the gas will show you exactly what I mean.

Its specific gravity is found to be 1.527, *i.e.*, it is more than half as heavy again as air. On this fact is based the method of bringing the bag containing the gas as close to the face-piece as possible, so that little or no effort on the part of the patient, should be necessary to obtain a full and free supply. Hence, too, arises the objection to the long, wide tubes we sometimes see intervening between the bag and the face-piece, and the importance, if you work with a gasometer, of having the counter-weights comparatively light—at any rate during the inhalation—so that the heavy gas is forced in a continuous stream through the face-piece, and has not to be sucked up by the patient.

Again, the solubility of the gas in water, like most gaseous bodies, decreases as the water is warmed. At freezing point one vol. water absorbs 1.305 vol. of the gas, while at about summer heat one vol. of water only dissolves .608 vols. of the gas, and it is still less soluble in brine. Hence we must either warm the water of the gasometer or use brine, and, in any case, must not change the water oftener than absolutely necessary for purposes of cleanliness, so that it may remain saturated with gas; the addition of a small quantity of fresh water or brine from time to time will be sufficient to counterbalance evaporation. And we must also recollect that, on account of its solubility, a six-gallon gasometer will take more than six gallons of gas to fill it, and we must not therefore judge of the amount of gas contained in the bottles by the number of times the gasometer is filled—there is always more or less waste, apart from leakage.

Chemistry also teaches us that the gas should be tasteless, colourless, and inodorous, and have no action upon vegetable colouring matters, such as litmus; on these facts we mainly depend for the detection of any impurities or adulterations. Those most frequently met with are chlorine, oxides of nitrogen, and odours of oily decomposition.

The specific gravity of the liquid, compared with water, is .936, and in consequence of its mobility, when the bottles are placed horizontally, the fluid very readily runs down towards, and chokes up the exit tube, and on turning the valve the gas escapes in a spasmodic and irregular manner, which may, to say the least, be very annoying. This state of affairs can be readily rectified, if the ends of the bottles



are slightly raised, so that the liquid tends to fall *away* from the valves, and, inasmuch as it is lighter than water, a very slight elevation of the ends is all that is necessary.

The effects of changes of temperature upon the liquid form of the gas are remarkable. One vol. of the liquid at  $0^{\circ}$  C. ( $32^{\circ}$  F.) becoming 1.202 vols. at  $20^{\circ}$  C. ( $68^{\circ}$  F.) and so on in proportion, while if cooled down below  $-115^{\circ}$  C. ( $-175^{\circ}$  F.) it solidifies. The practical bearing of these phenomena is obvious, suggesting on the one hand the importance of keeping the bottles at an equable temperature and not, at any rate, placing them in hot water or near or in the fire, as it is recorded has been done by more than one ingenious individual with astonishing and fatal results; results which, it may be observed, would not have occurred, had the gentlemen in question possessed but a slight acquaintance with the physical properties of the gas, as well as with its action and method of administration. On the other hand, it must be pointed out, that the extreme degree of cold mentioned, may be produced when the gas escapes very rapidly or continuously from a small orifice, and hence the gas should not be turned on suddenly, but gradually, and with a to-and-fro movement of the key or pedal.

Perhaps I have said enough with regard to the chemistry of nitrous oxide, both in its gaseous and liquid state, to point the moral if not exactly to adorn my tale; and you will, I think, hardly be prepared to deny, that a certain amount of theoretical knowledge, at any rate, is likely to be of service in this direction.

But, perhaps, the most important, and certainly the most interesting, portion of my subject, is that dealing with the physiological action.

And, first, as to the effects produced by the inhalation upon the gases contained in the lungs and blood, and for which I have used the term "gaseous interchange."

In this connection I would direct your attention to these tables:—

Table I. represents the analysis of the expired gases made by Professor Frankland at Mr. Coleman's suggestion, and is usually known as Coleman's Table. In the first column is the analysis of the gas itself before inspiration, the second and third columns, show the average result of the analyses of the gas, after the first and third expirations respectively. I do not wish to insist very strongly upon the actual figures, but rather upon the general appearance presented by the table, which shows us:—

1. That the expired gas tends to become precisely similar in

composition to that inspired, so that, *prima facie*, one would be justified in concluding that no very active decomposition of the gas occurs; and this conclusion is further justified by the researches of Hermann and other observers.

2. That the carbonic acid, instead of being increased in quantity, as is the case in aërial expirations, is rapidly and continuously diminished.

3. That the amount of oxygen is diminished and, in fact, almost entirely disappears.

4. That, as might be expected from the fact, that the nitrogen does not take any very active part in the physiological functions, even under ordinary circumstances, in gaseous inhalation, it is removed by diffusion alone, and hence very slowly.

5. That the substitution of nitrous oxide for the other gases does not take place at all equally or proportionately, but mainly at the expense of the oxygen, which is rapidly reduced.

Dr. Amory's experiments upon himself and upon dogs, have very much the same result, but were carried somewhat further. He found that the relative amount of carbonic acid exhaled during fifty respirations of the gas, was only about half of that found in the same number of aërial respirations.

Proceeding further, Table II., taken from the paper of Messrs. Jolyet and Blanche in the *Archives of Physiology*, represents the percentage of the various gaseous elements in the blood, before and at various stages of inhalation, and results almost precisely similar to those derived from a study of the previous table are obtained, *i.e.*:

Diminution of carbonic acid and oxygen.

Substitution of nitrous oxide for other gases, especially the oxygen.

A strict comparison of the figures contained in these two tables is hardly possible, as the analyses and experiments were not made by the same observers, nor under the same circumstances, but, at the same time, I think the two tables should always be associated, inasmuch as they corroborate one another in a remarkable manner.

TABLE I.  
GASEOUS INTERCHANGE IN THE LUNGS.

Gas.	Before Inspiration.	After first Expiration.	After 3rd Expiration.
Carbonic Acid ... ..	·103	3·187	2·346
Oxygen ... ..	1·540	2·700	1·621
Nitrogen ... ..	6·160	17·854	17·100
Nitrous Oxide ... ..	92·197	76·259	78·933

TABLE II.  
GASEOUS INTERCHANGE IN THE BLOOD.

		Breathing Air.	Breathing Nitrous Oxide.		
			105 Seconds.	3 Minutes.	4 Minutes.
Carbonic Acid	...	48.8	37	36.6	34
Oxygen	...	21	5.2	3.3	.05
Nitrogen	...	2	.7	nil	nil
Nitrous Oxide	...	nil	28.1	34.6	37

By viewing these tables together, we are, I think, entitled to conclude :

1. That the progressive loss of carbonic acid in the expired gas is not associated with any accumulation in the blood, and must, therefore, be due either to lessened production in the tissues or to defective absorption by the blood.

2. Now, in order that carbonic acid may be produced, free oxygen, or an agent capable of yielding free oxygen, must be present. But we see (Table 2) that the free oxygen is displaced by nitrous oxide, and we know that the latter undergoes no decomposition in the blood.

3. Hence, during inhalation, the process of tissue metabolism and the production of free carbonic acid is in abeyance.

On researches such as these is based the *rationale* of the supplemental bag ; those who advocate its use pointing out that, as the nitrous oxide is unchanged, there is no reason why it should not be inhaled over and over again, especially as dangerous accumulation of carbonic acid cannot ensue, unless the supplemental method be pushed too far. Hence, too, we are entitled to argue, that as the production of carbonic acid ceases after the first few inhalations, and that that gas tends slowly but surely, to diminish in the blood, the action of nitrous oxide as an anæsthetic cannot be ascribed to the presence of carbonic acid alone, but rather to its own specific or inherent properties.

On somewhat similar arguments, too, are founded the methods of the late M. Paul Bert, who, by conducting the inhalations in a special chamber under artificially increased barometric pressure, was enabled to supply the amount of oxygen necessary to maintain

life, without diminishing the actual amount of nitrous oxide necessary to produce anæsthesia, and so perform lengthy operations under the influence of the gas.

We will next consider briefly the effect of the gas upon the cardiac action and vascular system, as shown in the sphygmographic representations of the pulse during inhalation. A comparison of the pulse trace taken from an average healthy individual during the height of anæsthesia, with one taken from the same individual immediately prior to inhalation, shows—

1. An actual increase in the number of heart beats.
2. The greater height of the stroke.
3. The greater sharpness of the initial curve and apices.
4. The almost complete absence of the tidal wave.
5. The accentuation of the dicrotic wave, which is at the same time removed further from the apex of the trace.

I think we may gather from the consideration of these tracings alone, (1) that the heart's action is accelerated and slightly increased in force; (2) that the blood-pressure is lowered; and this latter point has been proved by actual experiment. It has also been found that the vessels themselves tend to dilate slightly, as may be actually observed in patients with venous radicles about the face. From this general rule we must except the vessels connected with the so-called splanchnic area (kidney, spleen, &c.), which contract in a very decided manner.

The action of the gas upon the blood corpuscles is practically nil; all we can say is that, as a whole, the blood becomes darker, or, in other words, retains its venous characteristics; whether or no the nitrous oxide exists in the form of a loose chemical compound with one or other of the constituents of the blood, as is probable, or whether it is free, is a matter of uncertainty.

From a consideration of these facts we are taught that, as the gas acts as a cardiac stimulant, syncope is more likely to arise from shock, consequent upon too little gas being given, rather than from any specific effects of the gas itself, in this respect contrasting pleasantly with chloroform; that the lividity can be accounted for by the circulation of the unoxygenated blood in the dilated vessels, and is not of necessity due to blood stasis or congestion; and that the blood-pressure being lowered during inhalation, we need not hesitate to administer nitrous oxide when the tension of the pulse is high.



Dr. Amory, of New York, showed that the effects of gas upon the physical condition of the brain was first to accelerate the cerebral pulsations, which subsequently diminished in number, apparently in direct proportion to the variations in the respiratory rate, and at the same time the whole brain increased in size, apparently from increase in the vascular supply. These observations have been confirmed by Dr. Buxton, who has also found that the whole of the cerebro-spinal system shares in this increase in size.

The exact practical bearing of this change it is difficult at present to decide, or even theorise upon. Whether or no the pressure of the swollen cord upon the spinal canal, may have any effect upon its conducting power, is quite conjectural, though it must be pointed out that the superficial reflexes disappear early, and that ankle clonus is sometimes developed.

Time will not permit me to do more than allude very briefly to the functional changes in the nervous system. Modern investigators are in the habit of dividing the period of inhalation into two very distinct stages—a short one of actual excitement of both mental and physical functions, and a longer one of narcotism, gradually extending and deepening, until the centres in the medulla presiding over the vital functions become involved. The practical bearing of these functional changes, would seem to me to point to the importance of administering the gas quite pure and very freely, so that the period of excitement may be as short as possible, and the narcotism developed correspondingly early. When the period of excitement has passed off there cannot be, I should imagine, any very serious objection to the use of the supplemental bag, but, on the contrary, many advantages.

Of the effects of the gas upon the organs of special sense, the only one to which I shall refer is the dilatation of the pupil. This, under ordinary circumstances, may be due to paresis of the motor oculi nerve, with consequent loss of power in the circular muscular fibres of the iris; to irritation of the sympathetic, producing increased action of the radiating fibres; or to the action of a special centre presiding over dilatation, and which is said to exist in the medulla. It must also be remarked, that violent muscular efforts are known to be associated with dilatation, hence it may, in the case of nitrous oxide inhalation, be due to muscular spasm.

I am myself in the habit of teaching, that this dilatation is much more likely to be connected with vaso-motor disturbance, and of

pointing out that its sudden development is often the forerunner of actual syncope, which the phenomenon in question invariably precedes, or is coincident with, in any case; and I believe that in the large majority of cases this explanation is the correct and safe one, though I will not deny that gradual dilatation may also arise from one or other of the causes I have mentioned.

As to the mode of action of the gas; there can be no doubt, that a very decided dissimilarity exists, between the phenomena observed during asphyxia from deprivation of air with consequent accumulation of morbid products in the blood, and those of nitrous oxide inhalation, but the gas undoubtedly possesses in itself specific anæsthetic properties, though these specific properties require for their satisfactory development the presence of large quantities of gas in the blood; hence the gas must be given quite pure, to the exclusion of all traces of atmospheric air. This exclusion of air unfortunately leads to the development of symptoms of oxygen starvation (not true asphyxia), and, as at present administered, it is impossible to exclude these symptoms, though it has been done by the special methods of M. Paul Bert.

Although nitrous oxide enjoys the reputation of being practically the "safe" anæsthetic, it must be recollected, that many of the early investigators considered that its use was attended with grave risk and serious dangers. In recent years, M. Laffont has drawn the attention of the profession, to some conditions in which the administration of the gas, appears to have been attended with more or less serious consequences, but these gloomy prognostications have not been verified, and would almost appear to be isolated cases; and, in spite of these and other adverse opinions, the popularity of the gas increases daily, leaving the success, safety, and exact mode of action, to be explained as they may by theorists and physiologists. At the same time, I think that we should always bear in mind that objections have been raised, and it therefore behoves us to conduct the inhalation with every possible precaution and care.

Of the *post-mortem* appearances there is little to be said. In animals they are precisely those of asphyxia—in human beings, of simple shock and syncope; in neither case have any specific signs or lessons been discovered.

A consideration of the physiology, and of the recorded cases of death while under the influence of the gas, teaches us the following lessons:—

1. That when death has occurred it has been due either to syncope or asphyxia.

2. Simple faintness may occur either before the inhalation is complete, apparently from fright, or during the stage of recovery, apparently from the shock of the operation.

3. Fatal syncope has, with very few exceptions, been distinctly traceable to the shock, consequent upon commencing or continuing the operation when the anæsthesia was incomplete, and have, as may readily be imagined, occurred in patients more or less out of health.

4. Hence the importance of never permitting any operation in a semi-anæsthetical condition.

5. The occurrence of asphyxia from laryngeal spasm, or from falling together of the epiglottidean folds, as in chloroform, has not been recorded with regard to nitrous oxide, and does not seem likely to give rise to any trouble. Such a condition, if it does occur, is, of course, to be looked for during the height of anæsthesia.

6. Fatal asphyxia has invariably been the result of some mechanical cause, *e.g.*, regurgitation of vomited matter, slipping of tooth or gag into the larynx, and has therefore usually occurred during or immediately after the completion of the operation.

7. Hence the importance of watching the mouth, as well as the face, during the stage of recovery.

Although I am fully aware of the importance of early recognition and prompt treatment in such cases, time will not permit me to do more than briefly summarise.\*

#### SYNCOPE.

*Recognised by*—Sudden dilatation of pupil, extreme pallor, heart failure, muscular relaxation, feebleness of breathing.

*Treatment*.—Prone position, draw out the tongue; artificial respiration.

#### ASPHYXIA.

*Recognised by*—Increasing duskiness, violent efforts at respiration, gradual failure of pulse.

*Treatment*.—Remove foreign bodies (inversion), or draw the tongue *well* forward, press on the chest, wipe out mucous; laryngotomy followed by artificial respiration.

Last, but by no means least, let me insist most strongly upon

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\* For details upon this and other subjects treated in this lecture, see author's "Manual of Nitrous Oxide Anæsthesia," published by Messrs. J. & A. Churchill.

the importance of keeping a record of all cases in which anæsthetics are administered—whether the course of the administration is marked by the development of abnormal symptoms or not. Accumulated evidence on any point is always of value, however trivial that point may appear to be at the time. In order to aid those who may be inclined to act upon this suggestion, I have endeavoured to lighten the labour of note taking by arranging the Register which you see on the table this evening,\* and in drawing up which I have been much assisted by my colleagues at this hospital.

Gentlemen, not only is the time allotted to this portion of the evening's work at an end, but I fear I have also exhausted your patience. I have, however, to thank you for your kindness in listening to me so attentively, and to express the hope that I have not altogether failed in my endeavour to show you that the administration of nitrous oxide has a scientific side, and is not merely a question of routine.

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## EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

By W. ST. GEORGE ELLIOTT, M.D., D.D.S.

(*Delivered at the National Dental College.*)

(*Concluded from p. 437, Vol. VII., October, 1887.*)

### PIVOT TEETH, CROWNS, &C.

Pivot teeth have probably been used to a limited extent for several hundred years. We are certain that they were known over a century ago, as Woofendale has left us the record as far back as 1783. At the same time, they must have been seldom met with up to a comparatively recent date. Attention has only been called prominently to the matter within the last twenty-five years.

Human teeth were solely relied upon in the days anterior to the introduction of porcelain teeth, and are occasionally to be met with in our own time. There is some temptation to use them, on account of their natural appearance, but the decay which so generally sets in, added to the disagreeable odour that they produce, has properly banished them for ever.

The earliest form of pivot, or pin, was that of wood. This material, while for many years extensively used, is now only occa-

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\* To be obtained (in books of 250 cases) from Messrs. Smith, 52, Long Acre.



sionally met with, it having been replaced by the more desirable metal substitutes. When wood is preferred, compressed second-growth hickory is found to be the best, and the pin used should be one-eighth of an inch in diameter and half-an-inch long. The old-fashioned pivot crowns in America were shaped like the natural tooth above the gum, and had a hole in the axis which, however, did not pass through, as in tube teeth. The wooden pin was forced into the crown, and fitted while dry into the hole prepared in the root; reliance was placed upon the moisture to swell the wood, and thus make the tooth firm.

In some mouths wooden pivots have proved fairly durable, but in the majority they are of little value. I remember seeing a case while practising in Callao (Peru) in which the wooden pin had been in place for fifteen years and was still perfectly serviceable.

Soon after wooden pivots came into general use attention was given to metal substitutes, as well as to a combination of the two—a wire centre in a wooden pivot (White, 1861)—and from that time down to the present the different kinds of pins, screws, tubes, caps, &c., that have come before us is something remarkable; probably not less than one hundred and fifty have been published. I cannot, however, go into all the varied forms, even if I had accessible data to draw from, but will merely outline some of the more prominent, mainly for the purpose of preventing their being reinvented and again offered to the profession as something new and valuable.

I shall try to classify and arrange some of the many forms; but many absolutely refuse to fall into line, and must be described separately:

Wood pin or pivot in nerve canal, with and without cement packing. (Woofendale, 1783; Willard, 1852; Muse, 1853; McQuillen, 1863.)

Wood pin in tube forced into canal, with and without cement. (Old Practice, 1876.)

Wood pin in tube, screwed into root.

Vulcanite pin, with and without tube and packing.

Vulcanite pin with wire centre. (Richardson, 1862.)

Metallic pin soldered to plate tooth and forced into root, with or without cement. (Van Marten, 1874; Flagg, 1865).

Metallic pin vulcanized to vul. tooth forced into root, with or without cement. (Richardson, 1862.)

Metallic pin cemented in root, and projecting into and cemented to crown. (Bonwill, 1880.)

Metallic pin, split or otherwise, fitted to tube in root, pin fastened to crown. (Balkill, 1875.)

Metallic pin soldered to cyl. cap, cemented into root. (Buttner, 1883.)

Metallic screw in nerve canal, with and without cement, with nut on projecting portion. (Bonwill, 1875.)

Metallic screw of silver, screwed into gold-filled root, crown attached to same by Wood's metal. (Latimer, 1865.)

Metallic screw in tube, tube tapped inside or out, or both. (Richmond, 1879.)

Metallic screw in canal, with or without cement.

Metallic screw through crown into wood in root. (Foster, 1879.)

Metallic screw through vulcanite, backing in root. (Register, 1875.)

Metallic screw in wood in root, split and projecting; wood wedge and ferrule and pivot crown. (Wetherby, 1866.)

#### CROWNS :

All gold, swedged, with cross bar, cement packing. (Morrison, 1869; Beers, 1873.)

All gold, low cap to stump, screws through into root, gold crown fitted over. (Talbot, 1880.)

All gold, low cap to stump, swedged cusps, space between filled with melted gold. (Rollo Knapp, 1887.)

All gold, struck up from sheet metal, without joint. (Reiner, 1885.)

#### PORCELAIN-FACED CROWNS :

Cap to stump, plate tooth contoured with gold, cemented pin in root. (Richmond, 1879.)

Cap to root, sheet metal sides, centre filled in with melted gold. (Rollo Knapp, 1886.)

Hollow crown, with porcelain front let in to same, and held by cement, &c.

All-gold crowns were introduced to the profession by Dr. Morrison, of St. Louis, about 1869, but they were not generally known, or, where known, not fully appreciated, until within the last ten years. They are, in my opinion, one of the most valuable means at our disposal for rendering broken-down and otherwise unserviceable molars useful.

Briefly, they are hollow crowns made of No. 20-carat gold, and shaped like the original tooth. They may be made in a number of ways, but I prefer the following :—The root is prepared by cleaning and stopping the canals in a thorough manner, for which purpose I use liquid and solid gutta perchas. If the walls are sufficiently thick, undercuts are made in them to anchor the cement filling; if they are not strong, pins are fitted into the canals, either at a sitting in advance of the final completion, or at the same time. The standing walls, if any, are cut away sufficiently, so that they do not interfere with the fitting of the crown or with its articulation. An impression is now taken of the tooth in gutta percha, and the bite in Stent, and a model cast in Spence metal. Upon this model the band is fitted and soldered. When this is done, a suitable cap is selected, fitted into the band with wax, and the whole tried in the mouth, and both band and cap fitted, the one to the gum, the other to the antagonising molar. The whole is then removed, invested in plaster and sand, and soldered with 18-carat solder.

A staple of gold wire, or other suitable mechanical means of anchorage, is now soldered in the inside of the cap, which, after polishing, is ready to be placed in the mouth.

The cavity and tooth having been thoroughly dried by means of Japanese paper and the hot-air syringe, and the pins placed in the canals, the cavity and the crown are filled with oxyphosphate cement, the crown placed in position and bitten upon to see that the articulation is correct. The cement in excess is found squeezed out beside the gum; this is removed, the parts kept dry for a few minutes, and the operation is complete.

There are several advantages in this mode of procedure. It takes less time and is much easier to the operator and the patient than if the band were fitted entirely in the mouth. It is vastly simpler and much less expensive than the Rollo Knapp process, which is as follows—

The tooth is cut down almost to the gum, on this a cap is fitted not unlike the lid to a bandbox: this is a difficult operation and takes much time. Upon this cap is built a wax tooth: this is artistically carved and properly articulated; it is then removed from the mouth. An impression of the top of this wax tooth is taken in pumice stone and glycerine, and into this is poured zinc. With a die thus made and a block of lead the cap or cusps are struck up from thin sheet gold. The cusps, after trimming, are placed upon the wax model and the sides are covered in by sheet gold, leaving an

opening. The sheet metal connects the gold cap or cusps with the shallow cap intended to cover the root.

The tooth is now invested in plaster and marble dust, except the side uncovered, and when dry it is heated up by the Knapp blow-pipe, which, having a small and pointed flame, readily melts the bits of gold and solder that are put in the hole, the melted metal taking the place of the wax.

The blow-pipe referred to uses nitrous oxide under pressure, as in the ordinary fluid form, together with common illuminating gas. The resulting flame is small and pointed, and is quite efficient for the purpose specified. The consumption of nitrous oxide is about a quart in six minutes, a gallon thus lasting twenty-four minutes, depending, of course, on the size of flame; this cannot be considered expensive; and yet those who can obtain Bine's oxygen, as we have it in London, are much better off, as the cost is  $2\frac{1}{2}$ d. a foot as against 8d., or less than one-third. The advantage in the nitrous oxide is that it is always to be found in every village. But it is quite unnecessary to employ any special apparatus as a blow-pipe; merely attach a tube to the illuminating gas, and another to your nitrous oxide bottle, and connect the two at a common mouth blow-pipe. I have thus used them for a year without trouble.

In the latter process about double the gold is required and more than double the time, as five hours are considered by Dr. Knapp as necessary, while the former method—which is not the invention of any one person—takes but two hours. We are indebted to Dr. Starr for the means referred to of rapidly swedging the caps, in excellent imitation of the natural cusps, &c.

It is desirable, although not a necessity, that the sides of the hollow crown just described should be rounded or contoured. This is done after the band has been soldered together. The central portion of the band is, by the aid of the contouring pliers, bulged, or rounded outwards, so that a horizontal line drawn through the centre of the tooth is longer in the centre than at the cervicle edge.

For many reasons it is considered an advantage to have the edges of the crown fit snugly around the neck of the tooth, but I have never found any gum irritation resulting from even a poorly adapted crown. The edge should press lightly against the gum all round, but not sufficiently to cause discomfort to the patient.



## PIVOT TEETH.

Pivot teeth, as ordinarily understood, mean all porcelain crowns as applied to the front teeth ; the general word crown is, however, displacing the older pivot. While lecturing on the subject last year, you may remember, I described some seventy modes of attachment. In the earlier part of this lecture I attempted to classify them, mainly by the character of the attachment. As they are only of interest from a historical point of view, we will not again refer to them, except to the few whose claim upon us cannot be summarily dismissed. The first special crown largely introduced since the days of the wood pin is the Bonwill, 1878 ; this is not the screw and nut crown of the same prolific inventor, but a materially different one. It consists of a porcelain crown with conical hollow interior, connecting with a small hole in lingual aspect. The root is filled with amalgam, a stout pin forced into it, the crown filled in the same way and forced over the projecting pin in root. When hard this tooth is generally very suitable, but it is often detached before the amalgam has sufficient time to harden, much to the discomfort of all concerned.

Personally I prefer the earlier screw and nut. With this I have met with much success. My plan of procedure is as follows. The root is disinfected and coned out in excess of the requirements of the pin ; it is then undercut with a wheel bur and thoroughly dried with hot air ; the cavity is then filled with oxyphosphate, and while still quite soft, the crown with its screw and nut in position, is introduced and moved into proper articulation. At a subsequent sitting, if there is no hurry, I take off the crown by releasing the nut, remove the oxyphosphates from the crevice, undercut and fill with amalgam, refit the crown and put some amalgam over the nut, or what is better, put on a second nut over the first—this generally prevents the loosening and falling off of the nut, which is the weak point in this mode of attachment.

Perhaps the easiest and the most satisfactory form of pivot is that where the pin has been baked into the body of the tooth, as in the one form of Richmond, the Logan, Brown, &c. The cavity is fully coned out and undercut and filled with oxyphosphate, and the crown introduced. As the crown covers the cement, and largely protects it from the action of the saliva, fair durability may be expected of it.

The manifest objection to this and all other special forms is the

necessity of an enormous number to match from. Dépôts do not care to carry a large stock, and if the chances of matching are poor, one must have recourse to some other plan. It is for this reason I generally make my own pivots, using a plate tooth backed and contoured with gold and pin attached, or plate tooth backed and contoured with gold, with a hole in centre for the screw and nut.

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### NATIONAL DENTAL HOSPITAL AND COLLEGE.

THE Annual Dinner of the Students of the above hospital took place on Friday, the 19th inst., somewhat earlier than usual, in order that the numerous friends of the late Dean, who is leaving England to live permanently in America, might have an opportunity of testifying their high regard for him in a tangible way. The dinner was excellently served in the Royal Venetian Chamber, Holborn Restaurant—a spacious room, the decorations of which are as tasteful as they are luxurious. Mr. Alderman Rymer, J.P., was in the chair, and was supported by about 100 past and present students and guests. The proceedings were throughout of the most enthusiastic character, and formed no unworthy closing scene of the English professional career of Mr. Thomas Gaddes, the hero of the evening, who has for nearly ten years, with marked energy, capability and courtesy, guided the destinies of the “National Dental” to a secured position among the beneficent and educational institutions of London.

After the usual loyal toasts,

The CHAIRMAN proposed the toast of the evening, “Health, long life and prosperity to Mr. Gaddes.” He said: Gentlemen, the annual dinner of the Past and Present Students of the National Dental Hospital and School is generally held somewhat later than on the present occasion—I believe about the month of November—but it so happens that something of a shock came over the profession, especially that portion of the profession which is connected with the National Dental Hospital and College, when they found that their old friend, colleague, tutor and adviser, their Dean of many years’ standing, was about to depart from among us. I say that a general shock was felt when the fact became known, and I say it advisedly, for no other term will fitly describe our sensations. Immediately it was arranged to organise some token of affection and esteem to Mr. Gaddes before he left this country, but the time was short; how-

ever, it did not take much time to decide, and to very soon subscribe, what was thought fit and proper towards a testimonial. The shape the testimonial should take had then to be determined upon, and this was speedily accomplished. We then learnt that Mr. Gaddes was leaving this country before the end of the present month, and so we have met in the month of October instead of in November. This now brings me to the toast which I propose to you, with mixed feelings of pleasure and of pain—of pleasure, because we must always delight to do honour to a man who has served the profession so faithfully and so well as Mr. Gaddes has done ; of pain, because we cannot but feel grieved at the separation of one so dear to us. I say advisedly dear, because by many of the students I am sure he is held in affectionate remembrance. I do not exactly know why I have been asked to propose this toast, except as forming one of the connective links between the past and present, but I see other links better and stronger around me ; however, in the peculiar circumstances of the case, it was thought advisable to ask me to present the address and the testimonial, which I shall esteem it a very great honour and pleasure to do in your names and in the names of many who are unable to be with us.

I have been acquainted with all that has been going on in the reformatory movement in the dental profession for many years. The early struggles I will not trouble you with now. But I may refer to the great aid which the National Dental Hospital and School has rendered to the cause of dental progress and education for the last quarter of a century, and particularly during the past ten years, during which period Mr. Gaddes has held the post of Dean, and has been the life and soul of the school. I am not going to ignore those who have gone before ; Kempton, the first dean, was held in the greatest possible honour. There were difficulties in the early years of the hospital which are now smoothed over, but it has been reserved to Mr. Gaddes to bring out prominently all the points—the valuable educational points—that were latent in the college, to the great advantage of the profession and to the great advantage of the public. Although the way has been smoothed somewhat, there has been, during Mr. Gaddes' reign, great difficulties to contend with. It requires not only a man of acquirements and capacity, but it requires also a man of tact, judgment and of genial and kindly temperament. It requires both the *suaviter in modo* and the *fortiter in re*. Young men want *kindly* supervision and advice, and they have always found

a right good friend in Mr. Gaddes. Then, to us old stagers who have been in frequent communication with Mr. Gaddes in various ways, it has been a pleasure on every occasion to meet him ; we have always found him most genial, and I can assure him that it is to us, as well as to the students, a source of great regret that he is about to leave us. However, he has left his mark, and it is a mark in the profession which I can assure him will never be effaced ; and in addition to that there is the mark of affectionate esteem in which he will be held by us, and although he will be on the other side of the water, our hearts will beat in affectionate unison with his. He is going to a fine country. I was in America last year, and I don't know that I ever enjoyed myself more in my life than I did when I crossed the "herring pond." After all, it is only a hop, skip and a jump now-a-days, and we shall hope to see our friend Mr. Gaddes here, if not annually, at least sometimes ; especially shall we hope to see him assisting at the inauguration of the new hospital. I hope, too, that we may, some of us at least, visit him in his new home, at Palmer Lake, near Denver. I shall certainly go and see him if I can.

Now, gentlemen, I have detained you long enough, and it only remains for me to present the address and testimonial. Mr. Gaddes, I have the honor to present you, sir, with an address, which is as follows :—

*Presented on his retirement from the Dental Profession to*

THOMAS GADDES, Esq., L.D.S.Eng. & Edin.,

Together with a diamond ring, as a small expression of sincere regard entertained for him by his former Pupils, Colleagues, and numerous friends, whilst associated as Surgeon, Lecturer and Dean of the National Dental Hospital and College, London.

*Chairman*—SAMUEL LEE RYMER.

*Dean*—F. HENRI WEISS.

*Secretary*—ARTHUR G. KLUGH.

October 19th, 1888.

I have further to present you, sir, with this gold watch and chain. It was originally proposed that the token should be a diamond ring ; a ring, you know, is symbolical of that which never ends—our affectionate regard for and remembrance of you will never end ; this watch you will observe is also round, and may therefore be said to be symbolical of the same things. I hope it will go to the end of your time, and may that be a long time. I ask you to accept this as a token of our enduring friendship, affectionate esteem and high regard.



Mr. GADDES, whose rising was a signal for long and enthusiastic applause, said :—

Gentlemen, your enthusiasm quite overcomes me. Mr. Rymer and gentlemen, my vocabulary—though I have been a student of the dictionary for the past ten years and more—fails me at the present time, and I am unable to find words in any way adequate to express to you the gratitude and happiness which possess me at this most eventful and ever-to-be-remembered moment. If there is any alloy to my happiness and gratitude, it is a feeling of regret that the kind sentiments towards me of those connected with the National Dental Hospital and College should have so extravagantly concreted in so handsome a gift. To you, Mr. Rymer, I must express my sincere thanks for the too flattering but, I am sure, none the less sincere eulogy you have passed upon my efforts, such as they have been, and they have been my best, to the furtherance of the welfare of the profession as a whole and of the National Dental Hospital and College in particular.

Mr. Rymer, gentlemen, has given you some little sketch of the struggles of the Hospital and College ; perhaps you will permit me to refer to those struggles as they apply to myself. In 1875 I joined the staff of the hospital ; in 1877 I became Sub-Dean of the school, and in 1879 I was flattered with the office of Dean, an office which I have since held down to the present time. During that time I have endeavoured, as far as my little ability would allow me, to do my best for the interests of the National Dental Hospital and College. Mr. Rymer referred to difficulties ; those difficulties, gentlemen, no one was more keenly aware of than myself and my colleagues. The difficulties were internal, and very largely, I am sorry to say, in a liberal profession, external. Nevertheless, acting on the reply which I gave to one of our colleagues when it was suggested to cease the struggle, I said, "No ; we will do good work, we will teach as best we can, and they *must* tell in the end ; they will be recognised." I am pleased to say the efforts of my colleagues must necessarily be recognised at the present day. The Institution, instead of being a faltering one hanging on between life and death, is now a reality ; and, gentlemen, what shall I say of the students ? If the Institution could be snuffed out—which it cannot be—our students cannot be snuffed out. There were also difficulties which I as an individual had to contend with when I began my professional life in 1875. I aspired high—I pitched my aspirations not on the lower

rungs of the ladder. There was, perhaps, a certain amount of folly in my so doing ; at all events difficulties encountered me, especially difficulties from without. It may not be unknown to those present that in addition to my Deanship I have been associated with our periodical literature. Now it is impossible to hold the position of an editor without incurring certain penalties ; if there are advantages, there are also disadvantages. He may make friends and he will, if he discharges his duties fearlessly, certainly make enemies. Unfortunately, gentlemen, I found very early in my career that I had made enemies, and not only enemies, but antagonists, and also, I am happy to say, many friends. The attachment of those friends I greatly esteem to-day, and when I leave England to take up my abode in America nothing will give me greater pleasure than to look back upon the friendships I have formed in my thirteen years' active professional life in my native land. Some of the difficulties by which I have been met, and to which I have referred, came from those from whom one might have expected encouragement and sympathy ; came from those who occupied high and important positions. It may be asked why do I refer to these things now ? why on this harmonious occasion do I speak of untoward events ? Gentlemen, I refer to these things in order that it may be a lesson to those who have been antagonistic or who have aided in the opposition to efforts to further healthy progress. I do so, also, for the guidance of young men ; not as a deterrent, not as a warning, but by way of counsel and advice, that they may well count the cost before they put their hands to the plough. If they decide to do battle against cliques and against prejudice under the banner of progress and independence, they also may be met by bitter opposition. But if they fight manfully, they strive earnestly, victory must be theirs : right will assuredly triumph in the end. But, gentlemen, if there have been rivalries and opposition which have beset one's struggles for advancement, coming, too, from a quarter where one might have looked for assistance—though, indeed, if we take the words of Darwin, he distinctly tells us in his "Origin of Species" that the greatest enemies in the struggle for existence are not between different but amongst allied species—they have, perhaps, been not altogether without their uses : they may have been blessings in disguise spurring me on to efforts which I might not otherwise have made. So much for the National Dental Hospital and one's public and private interests.

Coming now to a still more tender subject, the reception of this most handsome Testimonial which you have been good enough to present to me. I am quite at a loss to tell you how I am overwhelmed by the kindness of those who have participated in it. As the vellum states, it was originally intended to give me a diamond ring, but some few days ago our Secretary waited upon me and informed me of your intention. I then told him that I never had worn a ring, and did not think that I ever should wear one; indeed, rings had been bequeathed to me and I had returned them; and so you have substituted this splendid watch and this most elaborate chain. Mr. Rymer told us that a ring was symbolical of that which never ends; but here I have many elongated rings, and these rings linked together are better symbols of the many friendships around this board, linked together by the bonds of sympathy and mutual regard. I can now, sir, only thank you with all my soul, thank you with all sincerity for your kindness, your support, your encouragement, your assistance during my connection with this Hospital; had I not had good collaborateurs what has been done could never have been done. These mementos of your goodwill, regard and friendship I shall ever carry with me and cherish as long as I am capable of cherishing anything—to the end of my days.

Mr. WILLIAMS briefly and suitably proposed the health of the staff, coupled with the name of the new Dean, Mr. Henri Weiss.

The DEAN (Mr. Henri Weiss), who was received with great cordiality, said: Mr. Rymer, Mr. Williams and gentlemen, as the mouthpiece of the staff on this occasion, I beg to thank you most sincerely for the kind terms in which you have proposed this toast, and you, gentlemen, for the hearty reception you have given it. We have already heard from more than one speaker the history of the Hospital, and far be it from me to detain you any further upon that somewhat painful subject. The dentist may be said to be a combination of nature and of art; man being a product of nature, and dental education being compulsory, the two have produced the dentist who while he cures diseases, creates a great amount of inconvenience and not unfrequently a great amount of pain. It is incumbent upon us to see that those who enter the Hospital are prepared in such a manner as so give the greatest satisfaction to the public, and reflect the greatest honour upon themselves if they wish to lay claim to being members of a learned profession. In that way we are stimulated in a two-fold manner: First, in the way of honour, in doing our duty to

those gentlemen who enter the Hospital ; and secondly, to the country to which we belong, as we know the State has ordered that all persons practising the science of dental surgery must be qualified. Owing to the interest which I take in the National Dental Hospital, when I heard of Mr. Gaddes' impending resignation and total severance of his connection with us, it gave rise to no small alarm. We have all felt so much confidence in him that it was difficult for us to imagine the hospital continuing with anything like the same amount of success without him. We have been, however, compelled to put up with the inevitable, and more than that, his resignation was not a thing to be postponed ; we were obliged to accept it, and that immediately. That being so, we felt that the work of the Hospital must devolve upon other heads ; and whether one should be selected as a nominal head or whether we should manage the thing collectively, was a matter which has had our careful consideration. Ultimately, I was very kindly requested by many of my colleagues to accept the post of Dean, but the new responsibility so overawed me that I felt it impossible to accept it on the moment ; however, I have consented to accept the position *pro tempore*, and whether I maintain it, I think, rests rather with you than with me. I feel willing to carry forward the work, if you only feel that I am capable of holding and doing justice to so important an office. The duties of a Dean to the uninitiated might appear very light indeed, mere routine work ; but when one looks well into the subject, one finds that the same routine work is very complicated indeed. It is not a position where a strict observance of *otium cum dignitate* will suffice ; dignified indolence—if indolence can ever be dignified—has played no part in bringing the Hospital to its present state of efficiency ; and I feel satisfied that without a great deal of work on the part of the Dean an Hospital like ours would suffer. If you feel at any time that I am falling short of what you have a right to expect, you have only to give me a very broad hint, and I shall undoubtedly retire. So long as you put confidence in me, I shall ever be ready to further the interests of the National Dental Hospital and College to the best of my ability.

We know that we are passing through a crisis in our history. I have the pleasure to meet here this evening Mr. Morton Smale, the Dean of our sister hospital. Mr. Smale remembers as well as I do the London Dental Hospital when it existed in Soho Square. Its rooms were at the back of the house, were totally inadequate and deficient in light ; indeed I cannot say we ever had any light. However, to cut a long



story short, the hospital found it was not adequate for the demands made upon it. It had the good fortune to have many supporters, which has resulted in its developing into the magnificent structure which is now in Leicester Square. We cannot help feeling proud of that hospital, and we wish it success. As regards ourselves, we are just now in the same position as the London Dental Hospital was when it was in Soho Square. We have made an appeal, and we shall continue to appeal until we get our new hospital, which is so much needed. We have our site and we are waiting for an old lady to give up some of the tenant-right. I wish that every gentleman who is or has been connected with the hospital would take into consideration this appeal. Our present premises are quite insufficient for our needs or to meet the demands of the public upon us; we, therefore, must have a better hospital. There are not wanting points of analogy, as I have shown you, between our own history and the history of our sister hospital; let us do all that is in our power to complete that analogy by obtaining a building worthy of our work, and worthy of our position among the educational establishments of this country. In conclusion, I again thank you very heartily for your reception of the toast.

Mr. GADDES: Mr. Chairman and gentlemen, the honour has been awarded me of proposing what I should be inclined to consider the toast of the evening, viz., "The Health of the Students Past and Present." The students of our hospital, as indeed of any dental hospital, are really the backbone of the institution. As regards the Past Students, I think the school has every reason on the whole to be proud of them, for many of our past students are second to none as operators and practical dentists. With regard to the Present Students, of course they are an exemplary lot of young men—the best students, I am sure, the college ever had. And when I look at the toast list, and see that the present students are to be represented by Mr. Rushton, that is quite sufficient of itself to substantiate the accuracy of my statement. But although they are so exemplary, they must not forget that the past students have won for the school a prestige which it should be their aim and their pride to maintain, and they will find that to do that their utmost exertions will be required. In the Dean the students have a connecting link between the past and the present, and I may assure my able and amiable successor that he will find the present students most sympathetic, assiduous and tolerant—tolerant of what may have

been called, perhaps with some truth, the intolerable requirements of their late Dean. Gentlemen, in conclusion, I ask you to drink with enthusiasm the health of "The Past and Present Students," coupled with the names of Mr. Sidney Spokes and Mr. Rushton.

Mr. SPOKES, who was received with cheers, said he felt the responsibility which attached to him in attempting to respond for the Past Students. He felt sure they would agree with him when he said that the pleasure of looking back to the time when they were at the hospital was still with them, and that they still appreciated the efforts of the staff to impart to them the necessary information. It would be known to most of those present that a correspondence in one of the journals had been going on recently, advocating the establishment of a complete dental department in the general hospitals. Whether that came to pass or not, it seemed to him that so long as the present dental hospitals maintained the excellence of their teaching, it would require a very good department to upset the present order of things. With reference to the departure of Mr. Gaddes, he was quite unable to express the feelings that all past students had for him; but a resolution was passed the previous evening at a meeting of the Students' Society to which he would ask their attention:—

The members of the Students' Society of the National Dental College wish to convey to Mr. Gaddes, an honoured ex-President of the Society, their deep sense of the loss they must suffer by his approaching departure from England, and also to express, in some slight measure, their thanks to him for the valuable help he has always been so ready to give them.

Mr. Gaddes may rest assured that he will be followed by the best wishes of them all for his prosperity and happiness in his new world, and that his name can never be forgotten by this Society.

President, MORGAN HUGHES.

Secretaries, | ARTHUR P. STOCKEN.  
| ARTHUR FOGG.

In conclusion, he thanked them again for the manner in which they had honoured the toast.

Mr. RUSHTON also replied, and said: Mr. Chairman and gentlemen, our *alma mater* has conceived and brought forth students of whom Mr. Gaddes has intimated he is the father, and we are his sons. I think I shall faithfully represent the feelings of his numerous progeny if I say we are very proud of our parentage. We are sorry for some things that he is divorced from his good wife, and we hope that he will not abandon us altogether, but that we shall see something of him in years to come. I have to thank you, gentlemen, for the

cordial manner in which you have received and drank this toast. It is not a mere formality, but an outward and visible sign of your goodwill and good feeling towards the students of to-day. You can remember your own student days, with their trials, their triumphs, and—shall I say?—their temptations. You have passed through the mill and have left us your example, which we will endeavour to use all rational circumspection in following, and you give us your sympathy, for which we are not ungrateful. Well, gentlemen, I think we students may be likened to an interesting little animal, of which we have often heard Mr. Gaddes learnedly discourse—I refer to the “hyrax or biblical coney,” an animal which is spoken of in the Scriptures as a “feeble folk,” and we students are a feeble folk, and stand much in need of your help and encouragement. We might be likened unto odontoblast cells in various stages of calcification, gradually becoming impregnated with the lime salts of knowledge, and I hope, gentlemen, we shall become fully calcified to stand shoulder to shoulder in the dental structure, and that none of us will turn out an interglobular area of incapacity or unprofessional practice. To those gentlemen who have endeavoured to infiltrate us with some of the lime salts of knowledge we are deeply grateful—I allude to the lecturers, surgeons and assistant surgeons, and staff generally of our hospital. I am sure they do all in their power to help and guide us, by teaching, sympathy and example, to make us fit to take our proper places in our profession and pass our examination, which is, of course, the goal of our work. Above all, we have to thank one who is going to leave us. As Dean he was esteemed and respected by us all, his kindness, his sympathy and good advice being always open to us. As a lecturer, we admired him; and sometimes, when our brains got mixed up into a “mass of complex heterogeneity,” we could, by button-holeing him for five minutes, get them unravelled again. He had a funny way of putting things that would make them stick in our brains. As a visiting surgeon he was always ready to tell us what he knew, and he always *did* know—not that I wish to insinuate that our other visiting surgeons did otherwise. As a tutor those who had the benefit of his tuition say he *was* a tutor—not a crammer—and though many students have passed through his hands, I think I may safely say none have slipped through his fingers. I believe that there are all sorts of rumours and conjectures flying about as to where Mr. Gaddes is going; some say he's going cattle ranching, and some that he's going to join Mrs. Langtry in raising stock in California. Of one thing I am certain, that wherever he goes he will think kindly of us, as we shall of him. He will have a photograph of us “assembled in our thousands”—more or less—and I hope he will gaze on it sometimes and think of his old friends. Now, gentlemen, I have to present Mr. Gaddes with a little



gift from the students which, though small, reflects the feelings of affectionate regard in which we hold him. The gift is a case of surgical instruments, which we hope he will find useful.

*"Le roi est mort, vive le roi."*

Mr. Henri Weiss is our new Dean *pro tem.*, and I hope it will be a very long *pro tem.* He holds a name well known and honoured in the dental world, and in himself is well known to all of us. I am certain he will do all in his power to further the success of our hospital, and to add to its reputation. I am very glad to see next him Mr. Morton Smale, the worthy Dean of our sister hospital. Gentlemen, I did not quite understand all that was said by our Chairman and Mr. Gaddes about our dark days of the past—at any rate it was before my time; but I do think it is a good omen that the Dean of the sister hospital and our new Dean are sitting side by side. Let us hope that it foreshadows the friendliness and mutual good feeling that shall distinguish our future onward course.

Mr. GADDLES, who was again received with tumultuous cheering, asked permission to say a few words in recognition of the Address of the Students' Society and the gift of the Present Students, both so utterly unlooked for and yet so affectionately welcome. He was deeply touched by the kindness and the spontaniety of their offering. It was very fitting that the students should have chosen to give him a case of instruments, inasmuch as it was rather indicative that he was still a student, and always would be a student, and therefore the testimonial would be of great use to him in time to come. This case of instruments would ever be with him and would stimulate him—if stimulation were necessary—to think of them, as one student should think of another, with affection. Words were poor things on occasions like these, and he could only say from the bottom of his heart that he thanked them.

Mr. STOCKEN, in a few appropriate sentences, proposed the health of the Chairman, which Mr. Alderman Lee Rymer briefly acknowledged, remarking that he thought he had finished work years ago, but some of his friends thought there was "life in the old dog yet," and so they sometimes trotted him out, but he was never trotted out more willingly than on the present occasion, to do honour to his friend, Mr. Gaddes.

Mr. WILLIAMS asked leave to propose a toast which was not down on the card, owing to the modesty of the gentleman whose name he would give them, their indefatigable and excellent secretary, Mr. Klugh.

Mr. KLUGH, whose popularity always demands and obtains musical honours, briefly responded.

The toasts having been concluded, the company resolved itself into a smoking concert, which was thoroughly enjoyed, and was kept up until a late hour.

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### OUR LATE EDITOR.

FOR the first time since the DENTAL RECORD was launched upon the world, our journal appears without the familiar name of him to whom is largely, if not entirely, due the respect in which we venture to believe the DENTAL RECORD is held by our readers. And while the air is full of expressions of goodwill and esteem for Mr. Thomas Gaddes on the eve of his departure, we feel we cannot let the present issue go forth without a word expressive of the high regard which is entertained for him by all those who have worked with him and under him in connection with his Editorship. The wish of the Proprietors has always been that the best interests of the profession should be reflected in the pages of the DENTAL RECORD ; that all that would tend to advance and elevate the profession to its rightful position should be steadily advocated, and that everything dishonouring to it should be vigorously denounced. These aims have also been the aims of our late Editor ; how faithfully he has kept these aims in view our past will bear witness. With unflinching courage and independence, and with untiring energy, Mr. Gaddes has worked from first to last, and it is with no small regret, but with every good wish, we bid him farewell on vacating the editorial chair. It is not our intention to speak of his professional capacity or attainments—these are well known, and have already found expression elsewhere—suffice it to say that it is no slight tribute to his ability and his energy that at so early an age he should have attained the front rank of the profession, and, while carrying on a private practice, he should at the same time have discharged the laborious and responsible duties of Dean of an hospital and Editor of a journal. Mr. Gaddes will be remembered for his energy and ability, and not less for his genial courtesy and kindly consideration. We wish him a safe journey and long life and happiness in his new home.

### JOINT MEETING OF THE AMERICAN DENTAL ASSOCIATION AND SOUTHERN DENTAL ASSOCIATION.

At a joint meeting of the American Dental Association and Southern Dental Association, held on August 28th, at Louisville, Kentucky, when 273 names were entered on the register of visitors at the evening session, Dr. Abbott, president of the American Dental Association, read his address, inviting attention to a brief review of the last ten years of scientific work in the specialty of

dentistry in one particular line of study. The following abstract is from *The Dental Cosmos* :—

The superiority of the system of dentistry as practised in this country, he said, is so manifest and so universally conceded, that even comment is uncalled for. The unparalleled development of this specialty in medicine is forcibly illustrated by the number and generally good quality of the schools devoted to the education of young men for its practice, and by the increase of the literature upon dental and oral science, the richness of practical devices, useful inventions, and improvements in methods of treatment. In Europe, except England and France, there are few schools devoted exclusively to instruction in this branch of the healing art. The difficulty in establishing dental schools on the European continent seems to be their dependence upon the universities on the one hand and the meddling of the governments on the other. A thorough preliminary education is required before entrance to the university in Germany and Austria, and then five years of hard work must be given to the study of medicine before the degree of M.D. can be taken. Until recently these preliminary steps were necessary before a specialty could be taken up. The very important branch of dental prosthesis is even now in the hands of technically skilled but otherwise uneducated persons. The dentist proper, who has a right to operate on the natural teeth, relies upon the dental technician, who is forbidden to practice "over the chair," for prosthetic work. The government sharply superintends the movements of these dental mechanics, and woe to them if caught extracting a tooth even. With us the utmost liberality prevails in the choice of a profession or trade. To enter a dental school the candidate must be able to satisfactorily pass an examination prescribed by those who are supposed to know what is needed. To make a successful practitioner of dentistry, a good general education, together with a good deal of brains, a vast amount of manual skill, and sound judgment are essential. We insist upon a good knowledge of anatomy, physiology, chemistry, pathology, and therapeutics; and we lay particular stress upon the all-important knowledge which enables the student to do independent work, both surgical and prosthetic, and do it well. The present or coming generation of dentists is nearly all college educated, and so strong has become the conviction of the necessity of a thorough education for proper dental practice that there are stringent laws on the subject in most of the States.

Dentistry has shared in the profits accruing from the inventive genius of Americans, but the zeal for improvement has caused no little harm in many cases, more particularly where the removal of certain teeth or the filing or grinding away of portions of teeth to make room has been practised. Under some circumstances it is undoubtedly good practice, but these are exceptional cases. Within the past eighteen months Dr. Younger has brought prominently before the profession the operation of implantation, but so far its permanency has not been accomplished. Absorption of the roots takes place in from three or four months to two years, and the implanted tooth is lost. It is to be hoped that the difficulties will soon be overcome. The fear has been expressed that so much meddling of the American dentists with the teeth of the people would finally lead to the complete destruction of the dentures of coming generations, but the reverse seems to be the fact, and the writer ventured the assertion that nowhere else in the world can so many well-cared-for and perfect dentures be found, in the mouths of the same class of people, as in America, a result brought about by the education of the people by educated dentists.

While the practical work of the specialty of dentistry has reached such a degree of perfection, the scientific or theoretical part has by no means been neglected. [In considering this branch of his subject Dr. Abbott reviewed the work and conclusions of Drs. Heitzmann, Bödecker, and himself, based on the bioplaxion theory of Heitzmann.] The fact that operations on the teeth are extremely painful will suffice to prove to an unbiassed mind that the hard tissues of the tooth, particularly the dentine, are endowed with life. The question is, where is this life located? Ten years ago, Dr. C. F. W. Bödecker succeeded in demonstrating that the "Tomes fibres" are formations of living matter. The conical offshoots emanating from the periphery of the dentinal fibres, were shown to penetrate light spaces in the basis-substance, which form a net-like arrangement throughout the dentine. In this view the whole basis-substance, formerly considered inert, is proved to be traversed by living matter. This is, of course, in pronounced opposition to the cell theory. Many botanists, however, both German and English, have of late conclusively proved that the so-called cells of plants are by no means individuals, but are all interconnected by offshoots traversing the basis-substance,—known in plants as cellulose, cement-substance, &c.,—thus establishing an uninterrupted continuity of living matter, the same as Heitzmann claims exists in animals.

Following Bödecker's demonstration, it was shown that in the process of caries of dentine in a living tooth a reaction takes place, known as inflammatory, to which view the writer still holds, after having repeatedly reviewed the ground then gone over. The formation of secondary dentine was elucidated by Bödecker, as also the process of primary inflammation in dentine, called by him ebonitis, in which there is a reduction of perfected dentine to its embryonal condition, from which a new tissue, osteo-dentine, arises.

For many years it has been a moot question whether enamel is a mere deposition of lime-salts or a tissue supplied with life and nutrition. Bödecker demonstrated in 1878 that there are interstices between the enamel-prisms holding extremely delicate fibrils of living matter sending offshoots into the prisms themselves, thus causing the transverse striations. The square fields caused by these striations were shown to hold a delicate light reticulum, also supposed to contain living matter. The writer is convinced, after ten years' study, that enamel is possessed of living tissue,—a conviction, he is sorry to say, shared by but few microscopists. The pathology of enamel also furnishes strong proofs of its life. He has demonstrated that in caries a partial reduction of the enamel to its embryonal condition occurs, and that pigmentation (incomplete calcification) shows a markedly distinct reticulum; and that stratification, anomalies in the course of the prisms, excess of club-shaped spaces, &c., are the result of faulty development, and as such prove the life of the tissue.

Bödecker found cementum to be identical with bone-tissue in every respect. In the writer's own observations the evidence is overwhelming that, no matter how anomalous the shape, the cementum is still filled with living matter, which is supposed to be continuous with that of the pericementum on the one hand and of the dentine on the other; so that a pulpless tooth may be retained in a useful condition almost indefinitely, provided it has an antagonist.

The development of the teeth has been carefully studied during the past eight years by Heitzmann and Bödecker. Their researches give evidence that the epithelial tissue of the cord is transformed into the myxomatous of the enamel-organ, which, as such, has ceased to be epithelial and is stored-up material for the formation of the future enamel. This myxomatous tissue is the matrix of ameloblasts, which break up into rows of medullary corpuscles, and these, after being infiltrated with lime-salts, build up the substance



of the enamel itself. In the development of dentine the same transformation takes place: first, the medullary elements of the papilla into odontoblasts, these again being transformed into medullary tissue, which as such receives the lime-salts and thus becomes dentine. Both enamel and dentine are the direct product of embryonal elements, the same as are all other tissues of the animal organism, the ameloblasts and odontoblasts being merely provisional formations.

The paper, after mentioning other workers in this line, Andrews, Black, Sudduth, Williams, and Stowell, as deserving of great credit for what they have done, closed with the hope that the time was not far distant when the researches made in this country will meet with the approval of at least a majority of microscopists the world over.

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### **THE TONSILS (FAUCIAL, LINGUAL, PHARYNGEAL AND DISCRETE); THEIR FUNCTIONS AND RELATION TO AFFECTIONS OF THE THROAT AND NOSE.**

By SCANES SPICER, M.D.Lond.,

Physician to the Throat Department of St. Mary's Hospital.

(From *The Lancet*.)

It has long been known that lymphoid tissue, especially in the form of lymph follicles, is very extensively massed together in the naso-pharynx and pharynx. The most conspicuous of these masses, the faucial tonsils, are very familiar pathologically. Likewise is that mass known as the pharyngeal or Luschka's tonsil, situated in the vault of the naso-pharynx, and which, when hypertrophied, forms post-nasal growths. To a less extent is appreciated that aggregation of crypts and follicles called the lingual or fourth tonsil, situated at the base of the tongue between the circumvallate papillæ and the epiglottis, although its pathological conditions are among the most fruitful causes of many of the paræsthesiæ and dysæsthesiæ of the throat. To the above must be added those discrete patches of follicles on the pharyngeal walls which form the anatomical lesion in chronic granular pharyngitis, and an enumeration has been made of the principal groups concerned in morbid states of this area. To understand why these various tonsils are so pre-eminently and conspicuously affected in diseases of the throat and nose, it is necessary to glance at their relations to adjacent structures and to the functions which they perform in the channels in which they are found, as far as is known; for there can be no doubt that such very large masses,

exhibiting, moreover, some complexity of arrangement and sharing so readily in disease, must serve in the performance of some very important physiological function or functions.

*The Faucial Tonsils.*—Taking first the faucial tonsils, it must be remarked that physiologists have been very much in the dark as to their true functions, if we are to judge by the statements, or absence of statements, in the different English text-books of physiology ; and physicians and laryngologists have not elucidated the matter much. The prevailing view appears to be that the faucial tonsils are essentially organs for the secretion of a lubricating fluid to aid in moistening the bolus of food before deglutition. Now, as the faucial tonsils are developmentally portions of the mucous membrane, there is no reason why they should not be provided with mucous glands to the same extent as the rest of the mucosa, and so secrete a little lubricating fluid, though insignificant in amount compared with that from the salivary glands. But that this secretion is a quite subsidiary and unimportant function of the faucial tonsils is palpable from the facts that in any tonsil healthy or diseased, infantile or adult, the component tissue is lymphoid, arranged in follicles, with more or less fibrous tissue ; and that the secreting mucous glands are very scanty, and, indeed, in the ordinary excised tonsil not demonstrable. No doubt, when these organs have been excised for hypertrophy, the fibroid changes have caused atrophy of whatever gland tubes there might have been. Such fanciful theories as that the faucial tonsils are developed as compensatory organs for warming the inspired air when there is nasal obstruction, that they are reservoirs of nutriment like adipose tissue, and that their function is to keep the liquor amnii from passing into the foetal pharynx, require no refutation here. It is to Dr. Hingston Fox in his admirable papers\* that we are chiefly indebted for a lucid exposition as to some of the main functions of the faucial tonsils. His conclusions are, firstly, that the faucial tonsils act in the prevention of fluid waste in the economy by reabsorbing the buccal secretions to a large extent after their work is done, and especially in the intervals of the deglutition acts ; secondly, that they absorb certain of the elements of the food bolus as it is squeezed past them in deglutition ; and, thirdly, that they form part of the blood-manufacturing system, and use up any nutriment remaining in the spent buccal secretions, acting, as he poetically expresses it, as “nurseries for young leucocytes, planted by

\* *The Lancet* and “*Journal of Anatomy and Physiology*,” 1886.

the waterside, and drawing their sustenance from the nutrient stream." The facts on which these views are based may be classified as follows:—Firstly, the *anatomical*. The tonsils are like sponges in texture, consistence, and structure, being riddled with lacunæ or crypts. Every bolus of food must be squeezed against them as it is swallowed, a condition most favourable for the transfer of soluble matters. Then, in the intervals of deglutition, these spongy organs lie in the glosso-epiglottic fossæ, soaking in the buccal secretions, which fill up all their pores, and are delayed in their passage to the pharynx, if not entirely absorbed. Further, the tonsils are constructed on the type of a mucous membrane corrugated so as to expose a large surface to something, and on these corrugations are thickly-studded lymph follicles, as well as in these organs a very rich plexus of lymphatic vessels, which must have some function, and what more probable than the relation suggested of which we have so much confirmatory evidence? Also, these follicle aggregations are situated at places just below the output of the buccal secretions, and in the course which these must take. Secondly, the *histological*. The faucial tonsils are composed of tissue—lymphoid follicles—almost identical with that of the essential parts of the blood-manufacturing system, the spleen, and lymphatic glands. Moreover, these adenoid follicles are densely crowded with leucocytes in all stages of development and with divided nuclei. The lymphatic vessel plexus throughout the tonsils is one of the richest in the body. Thirdly, the *physiological*. The faucial tonsils have very free arterial blood supply, which implies very considerable work done. Next it is a general law that fluids thrown out in the intestinal canal are absorbed by the segment of the intestine below, and in this area we have similar structures, the solitary and agminated glands, which are not found elsewhere in the body. Then, as a general rule, in health the tonsils atrophy in middle and late life, when blood manufacture is less active, and, on the other hand, tend to be large in children, when lymphoid tissues elsewhere are abundant and active, and blood manufacture is at its climax for the rapid processes of growth and nutrition. The considerations already stated render the correctness of the above views most probable, and it is the object of this paper to show that clinical and pathological facts harmonise with and corroborate them; and also support the view that other tonsils are largely channels of absorption.

*The Pharyngeal Tonsil.*—The anatomy and histology of this

body in all essentials is that of the faucial tonsils; there are not so many crypts, nor are they so deep or subdivided, but there are differences of degree. These facts alone would tend to show that its function is not dissimilar—viz., the prevention of waste of some secretion. Now, in the horizontal position of the body, in man, all the nasal and lacrymal secretions are bound to flow over it. Here, then, are all the conditions required on the hypothesis above enunciated; and when the facts from disease are added, the conclusion will be unavoidable that this tonsil saves and elaborates the spent nasal and lacrymal secretions.

*The Lingual Tonsil.*—An observation was recorded many years ago by Dr. Horace Dobell in *The Lancet*, and reprinted in his work on "Winter Cough" (third edition), that the uvula serves to convey the nasal secretions on to the base of the tongue in a plane anterior to the epiglottis, so keeping the constantly dripping fluids out of the larynx. This view was independently arrived at by me, and published in *The Lancet* and in the *British Medical Journal* (vol. i., 1888); but having since found that I have been anticipated by Dr. Dobell, I take this opportunity of crediting him with priority. My paper, however, read before the Harveian Society in 1888, also pointed out, that in the erect posture these nasal and lacrymal secretions were dripped by the uvula on to an aggregation of crypts and follicles on the base of the tongue, such as was concerned elsewhere in the reabsorption of fluids and blood manufacture, and claimed that the same functions took place here. It is obvious that the buccal secretions also, to some extent, come in contact with the lingual tonsil; also that any portions of fluid not dealt with by the tonsils find the epiglottis keeps them out of the larynx, and run along the grooved lateral spouts of the epiglottis into the pyriform sinuses or hyoid fossæ, when they are swallowed.

Before considering pathological causes which affect pre-eminently one or the other tonsil, it might be as well to state here that usually all the tonsils are more or less involved, and that anatomical lesions are rarely confined to any one.

Commencing first with the pharyngeal tonsil, it must be premised that its morbid conditions are connected with the respiratory current and the channel in which it lies. Of all proximate causes of affections of this body, the most frequent is chronic nasal catarrh, and I shall therefore offer no apology for suggesting an explanation of its genesis. I believe it may be sought in the extreme



variations in the temperature, humidity, and purity of the air breathed by civilised house-dwelling mankind, and, consequently, the great variation in the amount of moistening, warming, and filtering that has to be performed by the erectile mechanism of the nose. The savage, living in a state of nature, does not many times a day rapidly change his air currents from a temperature of 80° or more, and often laden with organic impurity and scorched up by a stove, for one frequently near the freezing point, and of widely different degrees of humidity and purity. The air he breathes is of a fairly constant quality comparatively by day and night. Hence there is a certain normal accommodation of his nasal erectile tissues to the work they have to do, which is not suddenly, frequently, or very materially departed from. We have in these considerations a possible explanation of the freedom of the Red Indians from catarrh, and the effectiveness of their nasal channels for breathing purposes as described by Catlin, who spent many years among them. On the other hand, with us civilised moderns, the frequent and sudden changes lead to corresponding activity in the erectile mechanism of the nose, and this repeated for months and years causes the erectile tissues to get into a state of irritable weakness, and to be permanently erected. There is then chronic congestion and discharge of a secretion differing somewhat from the normal. The exciting causes being constantly in action, chronic rhinitis is produced, then hypertrophy of the mucosa and narrowing of the passages. All this time the more or less perverted and acrid secretions have replaced the healthy ones, and have passed back constantly to the pharyngeal tonsil, which, having to tackle irritating secretions, gets swollen, inflamed, and in time hypertrophied, forming post-nasal growths, with all their attendant evils. Having had constantly under my observation some hundreds of children for the last five years, I have been able over and over again to trace the whole development of post-nasal growths from ordinary chronic nasal catarrh, and that in children who have lived under the most favorable hygienic *régime*, except in as far as the above-mentioned variations in the physical characters of the inspired air go; and it is to these variations alone that I can attribute the sequence of events. This state of chronic inflammation and debility of the tissues of the upper respiratory tract is not distinguishable from struma, and is often associated with general anæmia and debility, lymphatic gland affection of the neck, concomitant affections

of the conjunctivæ and ear (probably extension of inflammatory mischief up the nasal ducts and Eustachian tubes), and also by the forced substitution of buccal for nasal respiration, leading to depressed vitality of the tissues of the rest of the respiratory tract, facilitating the supervention of pneumonia and bronchitis, and preparing the soil for the invasion of the tubercle bacillus. The above account indicates correctly, I believe, the relation between chronic nasal catarrh and pharyngeal tonsil hypertrophy, and also between the latter and the other morbid states referred to. But there are other causes than this, both of nasal catarrh and of acute inflammation of pharyngeal tonsil, the chief one among them being mechanical irritants, such as ordinary dust, trade dust, pollen, or other finely divided matter, which, carried in by the respiratory current, ultimately find their way back to the pharyngeal tonsil in the secretions which flush the passages, thus causing direct irritation by their presence. In the same way the germs of the specific fevers—measles, scarlet fever, variola, &c.—reach the pharyngeal tonsil and cause it to inflame, block the nasal passages in varying degrees, and, by damming back secretions, to produce anterior rhinorrhœa; similarly Eustachian obstruction, retention of secretions, ear abscess, otorrhœa, and life-long deafness. Attention to the nose and naso-pharynx in specific fevers will be likely to prevent the conditions which are not susceptible of cure. Another cause of pharyngeal tonsil enlargement is to be found in its absorption of irritant matters regurgitated or vomited by infants into their naso-pharynx. This often produces an acute coryza and nasal obstruction, independent of mechanical occlusion of nares by vomited matter, and due to direct irritation and enlargement of pharyngeal tonsil. Irritating vaginal secretions introduced during parturition and exciting snuffles is a well-known cause of posterior nasal obstruction from inflamed pharyngeal tonsil. It is a striking clinical fact that there is an overwhelming preponderance of pharyngeal tonsil mischief in the young. Is the cause to be sought in the smallness of the naso-pharynx, the early blocking of the nose, and the consequent stagnation and decomposition of the retained secretions? Judging from the anterior rhinorrhœa of such an irritating character as to cause eczema and the foulness of the secretions dislodged in the digital examination of post-nasal growths, I conclude that this is often so, and that the decomposing secretions keep up the enlargement commenced by an ordinary catarrh.

The lingual tonsil next requires consideration, as it is in relation

with the same secretions as the pharyngeal, only especially in the erect position. All that has been said, therefore, as to the causes of chronic catarrh of the upper respiratory tract applies with equal force to lingual as to pharyngeal tonsil diseases, and in this conveyance of the acrid products of inflammation we have the main cause of its abnormal states. But there are many causes besides, especially the presence of deleterious and irritating matters in the alimentary ingesta. I would especially mention alcohol, condiments, very hot fluids, very cold fluids, or frequent alterations of these. Each of these can at times be distinctly traced as the exciting cause of lingual tonsil hypertrophy, which, in its turn, is the anatomical fact in the productions of the most obstinate and otherwise incomprehensible paræsthesiæ. In the case of this tonsil, too, morbid influences derived from vitiated blood and secretions are very manifest. I refer especially to gout and rheumatism. Both the nasal and buccal secretions are surcharged with the poisons of those diseases periodically; and there can be no doubt that the inflammatory condition of lingual tonsil seen, and central angina and constriction complained of, so often in these diseases, and which often precede other symptoms or are alone present, are due to the irritation of the lingual tonsil by the perverted secretions. Evidence confirmatory of this view is found in the fact that anti-diathetic treatment speedily cures the condition. The lingual tonsil does not show the same predisposition to be affected in syphilis as do the faucial tonsils. I venture to suggest that the syphilitic poison is excreted with the buccal secretions rather than with the nasal; and, as has already been stated, it is with the former that the faucial tonsils are in special correlation. An interesting observation bearing on lingual tonsil affection in scarlet fever was recorded to me by a pathologist who asked an explanation. In a fatal case he had observed ulcerations and erosions localised in the area of this organ. This pointed to the fact that the secretions loaded with germs and inflammatory products had vented their fury here, and seems singularly confirmatory of the importance of the lingual tonsil. Taking lupus of the nose and throat again, and infiltrations ulcerations have been found localised in the lingual tonsil area (Chiari and Reil), the infection having clearly been carried over healthy parts to a place where it could enter with the secretions and reproduce the disease. When there is nasal obstruction and substituted mouth-breathing, all the impurities of the environing atmosphere enter the mouth, and many

of them alighting on the mucous membrane, are washed on to the lingual and faucial tonsils. Moreover, work is cast on the linings of the mouth—that of warming and moistening the air—which does not belong to them. Hence drying of the surface and failure of the secretions to wash away the decomposing *débris*. In the morning the patient complains of a dry mouth and a slight sore throat, due to inflammation of the lingual and faucial tonsils. This at first passes off during the day, but after some time leads to hypertrophy of the irritated structures. Other frequent and potent causes of lingual tonsil abnormalities are tobacco smoking, chewing, and snuffing, their action being irritant to the lymph follicles throughout the upper respiratory tract. Septic influences, bad teeth, neglected dirty teeth, false teeth not kept clean or not well fitting, must be added to the list of common causes of lymph follicle irritation and hypertrophy throughout the whole area under consideration, and must be attended to before a cure can be expected. Lingual tonsil mischief is specially met with in adults, and not so much in children. The reasons I would suggest are that the latter do not indulge in alcohol, condiments, or very hot or very cold fluids; and also that the irritating secretions which in children are penned up in the nose or directed forwards owing to enlarged pharyngeal tonsil to produce a rhinorrhœa, in adults pass on (there being more room in the naso-pharynx) to the lingual tonsil.

Concerning the faucial tonsils, the special relation of these to the buccal secretions has been referred to, and also that the factors in the production of disease of the other tonsils affect these likewise. It is unnecessary, therefore, to recapitulate, but it remains for me to remark additional facts. Very often unilateral hypertrophy of a faucial tonsil is seen. How often is it not in relation with a carious tooth on the same side, constantly contaminating the buccal secretions on that side? There can be little doubt that the tonsils are the sites where the poison of scarlatina, measles, and diphtheria usually enter the system, since they are the parts first and most constantly, and often alone, visibly affected; and the lymphatic glands in direct communication with them most markedly, soonest, and most frequently involved. Faulty voice production and excessive use of the voice are very important causes of affections of all the tonsils. Excessive use demands excessive lubrication, and the latter implies excessive absorption on the part of all the lymphoid follicles. Hence the diffusiveness, chronicity, and obstinacy of the changes met with



in the throats of clergymen, actors, and Board School teachers. Regarding lacunar or so-called follicular tonsillitis (which, by the way, I have noticed more than once well marked in the crypts of the lingual tonsils), there are two distinct varieties clinically. The first is that in which superficial inflammation and swelling of the mucosa blocks the crypt orifices and causes retention of the shed epithelium and *débris*. This form is acute and usually easily curable, and may be brought about by septic or common cattarhal causes. It is painful, and requires sedative and antiphlogistic treatment. This variety often forms the starting-point of a lacunar abscess, or the process may extend deeper and peri-tonsillar abscess or quinsy ensue. The second form is chronic, and depends on a natural or acquired sluggishness with which the desquamation processes of the epithelium lining the tonsillar crypts are performed, and the *débris* is not normally extruded by a *vis a tergo*. This is not septic or painful, though there may be slight stiffness and discomfort. It is very chronic in course, and difficult to overcome, yielding best, however, to solvent and stimulant local applications. The discrete nodules in the pharyngeal walls partake in the morbid processes going on in the other tonsils, and are similarly affected by the causes acting on them.

It now remains for me to state that it has not been my object in this paper to give details of symptoms and treatment, and merely to indicate the lines upon which nose and throat affections should be treated when, as is generally the case, the various tonsils—the points of maximum irritation—show palpable signs of morbid action; and it must be observed that, when the various methods of treatment in use in the past are considered in the light of the above views as to the functions of the tonsils, it will be seen that these views afford a scientific explanation of the success of those empirical methods which have been hitherto the most approved. These lines would be, firstly, the ensurance of physiological rest to the affected tissues by arresting morbid and lessening profuse secretions, and promoting derivative action into other channels. In acute and sub-acute affections, a blue pill, followed by regular small doses of belladonna, gives excellent results. Secondly, the removal of all causes of irritation and inflammation in the inspired air, whether due to occupation, habits, or conditions of existence, and a similar regulation of the habitual alimentary ingesta. Thirdly, the soothing of any acute inflammation or pain by ordinary measures, ice, bland fluids, jelly, cocaine, &c. Fourthly, the attack of any diathetic condition which

may be causing perversion of secretions—as gout, rheumatism, syphilis, &c.,—on general principles. Fifthly, the removal of any hypertrophied tissue—such as enlarged tonsils, post-nasal growths, hypertrophied lingual tonsil, granules of granular pharynx, &c.—which may be occluding any physiological channel or causing mechanical irritation of adjacent parts by the numerous approved methods at our disposal. Sixthly, the prevention of the accumulation or stagnation of any of the secretions of the nose, mouth, or pharynx by cleansing and antiseptic washes.

In conclusion, I would say—1. The significance of the various tonsils is in their palpable relation to the blood-manufacturing system and to the outpour of copious secretions. The relations of the tonsils to the rest of the organism can be well appreciated by comparing them with the relations of the sewage farm to the town whose refuse it makes use of, and to which it returns its elaborated products. 2. If any of the secretions delivered to the tonsils become contaminated in any way with irritating matters, whether generated in the system or introduced from without, those tonsils in physiological correlation with the affected secretion show irritative changes varying in degree. 3. The function and affections of the various tonsils afford the key to the comprehension and scientific treatment—and the prevention—of many of the most intractable and recurrent disorders of the nose and throat.

## CORRESPONDENCE.

### HARVARD DENTAL ALUMNI ASSOCIATION.

*To the Editor of "THE DENTAL RECORD,"*

12, West Street, Boston,

*August 30th, 1888.*

SIR,—At the last meeting of the Harvard Dental Alumni Association, held in this city, the following action was taken regarding advertising by some of its members.—

Voted: "That the Harvard Dental Alumni Association discountenance any connection of its members with any advertising dental establishment; and whereas evidence has been presented that Drs. Curtis, Gerry and Veo have become so connected with a dental office in London, they are hereby suspended from membership in this association until they have discontinued their connection with such establishment."

C. WILSON,

*Secretary, Harv. D.A.A.*

**GOSSIP.**

THE Annual Dinner of the Staff and Past and Present Students of the Dental Hospital of London will be held on Saturday, December 1st, at the Holborn Restaurant, when the chair will be taken by James Smith Turner, Esq. Gentlemen, either now or formerly connected with the Hospital or Medical School who may, through inadvertence, not have received special notice, and who desire to be present, are requested to communicate with the Dean at the Hospital.

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CHARING CROSS HOSPITAL.—The Scholarship of fifty guineas, open to students of the Universities of Oxford and Cambridge, has been awarded to Mr. Albert Carling, of St. John's College, Cambridge; the Entrance Scholarship of one hundred guineas has been awarded to Mr. William Escombe; and that of fifty guineas to Mr. Percy J. Probyn.

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MR. H. CHARLES SMALE, L.D.S.Eng., D.D.S., has been appointed to the vacancy on the staff of the Victoria Dental Hospital, Manchester.

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ROYAL COLLEGE OF SURGEONS, EDINBURGH.—During the October sittings of the examiners, the following gentlemen passed the first professional examination for the license in Dental Surgery:—John Thomson Craig, Warwickshire; Frederick Jones, Lancashire; Edwin Eli Johnson, Lincolnshire; Henry Mallett, Devonshire; John C. Macnamara, Cumberland; John Stewart, Edinburgh; and Samuel A. Westerton, London; and the following gentlemen passed the final examination, and were admitted L.D.S., Edin.:—William Gray, Edinburgh; Edward John Montague Hodgkinson, London; and Arthur Turner, Aylesbury.

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THE value of the humble bee is well shown from the fact that, in 1885, one hundred were sent to New Zealand and set free at Lyttleton. By the next year they had penetrated as far as Timaru, and had increased to an astonishing extent. Since then the farmers find their red clover exceedingly rich in seed.

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BANDAI-SAN, in Japan, the seat of the great volcanic eruption, is 5,800 feet high. Until the recent outbreak it had shown no signs

of activity for about 1,100 years. At eight o'clock in the morning of July 15th, 1888, almost in the twinkling of an eye, the subordinate peak, Little Bandai-san, was blown into the air and wiped out from the map of Japan. A few minutes later its *debris* had buried or devastated an area half the size of London.

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PROFESSOR JUDD, in reporting of the Krakotoa eruption, says :— The excessively violent though short paroxysm with which it terminated is the special feature by which the eruption of Krakotoa differed from others of similar rank. Such volcanic eruptions, which at one time emit massive and viscous lava streams and at another pour forth more liquid lava, which burst out with explosive violence into an eruption, in which most of the lava is converted into pumice, are the result of the older lava having been chemically acted upon by water which has percolated through the crust. The new compounds thus produced are more readily fusible and more easily converted into pumice. Volcanic action is thus concluded to be brought about, not directly by physical action of externally derived water, but by changes in the physical properties of rocks, chemically altered through the medium of such water.

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THE first co-operative store was founded by Shute Barrington, Bishop of Durham, in 1794, at Mongewell, in Oxfordshire. The storekeeper was an infirm old man who could neither read nor write. His wage was a shilling per week. Here candles, soap, salt, sugar, bacon and cheese were sold at prime cost, at a saving to the poor of about 25 per cent.

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To get a grip of reality is a pleasure so keen, that it is not to be wondered at, that the student of nature should hanker after facts.

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AN ice machine is announced in which sulphurous anhydride is replaced by a mixture of sulphurous and carbonic anhydride. The boiling point of this mixture is stated to be about  $-2^{\circ}$  Fahr., and the pressure of the gas at  $+122^{\circ}$  Fahr., only one-half that of pure sulphurous anhydride. It is thought by the inventor that some sort of molecular reaction occurs between the gases when liquified, in consequence of which, the work required in compressing them is very much smaller than with any other materials.



THE introduction of salmon trout and brown trout into the rivers of Tasmania has resulted in complete success. Both species are now well established and are very abundant. The acclimatization of *salmo salar* in the same country may almost be looked upon as an accomplished fact.

THE investigations of M. Alexandre Vitzou in the anatomy of the dog, show, that the intercrossing of the nerve fibres are incomplete in the optic commisure.

OUT of a batch of two males and six females of the Hessian fly kept together, all six females laid fertile eggs, so that each male, says the observer, Mr. Enock, must have impregnated more than one female.

TROUVELOT has by photography obtained facts which lead him to think, that flashes of lightning may last several seconds. By giving his apparatus a slight horizon al displacement, he found a broad ribbon-shaped band on his plate.

THE world says Emerson is nowhere nailed up in boards, but is open to all if we will but open our eyes.

BOOKS are apt to turn reason out of doors.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, and at the Dental Hospital, Manchester, from September 1st to September 30th, 1888 :—

				London.	National.	Victoria.
Number of Patients attended ...				—	2071	947
Extractions	Children under 14	...	...	519	381	818
	Adults	...	...	1,145	525	
	Under Nitrous Oxide	...	...	675	607	69
Gold Stoppings ...				114	53	52
Other Stoppings...				403	340	90
Advice ...				171	471	—
Irregularities of the Teeth				33	68	—
Miscellaneous and Dressings				197	113	248
Total ...				3,257	2,558	1,277

# THE DENTAL RECORD.

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## INVESTIGATIONS ON THE PATHOLOGY OF ABSCESSUS APICALIS.

By DR. ARNIM ROTHMAN,  
(Assistant in the Budapest Dental Institute.)

(Translated by Geo. Cunningham, B.A., D.M.D., L.D.S.)

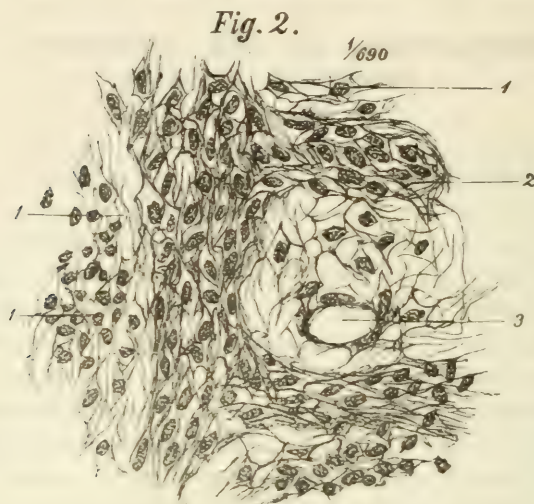
(Concluded from p. 462.)

THAT the development of "abscessus apicalis" is a process which is entirely identical with diffuse, purulent periodontitis is made clear by the following fact, that inflammation of the periosteum, if it appears in certain individuals, almost exclusively assumes the form of an apical abscess, while in others, in spite of repeated inflammation of the periosteum, abscesses never form. This empiric observation would tell in favour of Malassez's view, provided that epithelial cells were to be found in all apical abscesses. When we consider, however, that such epithelial cells are of very rare occurrence, we may explain the peculiarity in the following manner. The apical part of the periosteum is much thicker in those individuals who have a predisposition to "abscessus apicalis" than in others. This supposition is absolutely necessary, if "abscessus apicalis" is developed in a case of purulent inflammation, instead of "periodontitis acuta purulenta diffusa."

This particular assertion of mine is supported by the following important case:—A female patient had four roots extracted, and an "abscessus apicalis" was found to be already formed at each root. Some days afterwards devitalization and extirpation of the pulp were undertaken on account of "pulpitis chronica parenchymatosa," in an upper molar tooth belonging to the same patient. The pulp could not be removed because of the impermeability of the root canals. The tooth was stopped, and the patient used it, without experiencing the least inconvenience, for fully two and a-half years, when suddenly, violent throbbing pains began in the tooth during the mastication of some hard substance. The application of cold as well as warm water caused a disagreeable feeling, the tooth appeared to be somewhat elongated, and slight pressure against the palatal root produced a

violent paroxysm of pain. These symptoms indicated "abscessus apicalis," and when the tooth was extracted, six days after the pain had set in, the diagnosis proved this supposition to be perfectly correct.

The microscopic appearance of this abscess is represented in Fig. 2. A portion of the middle layer exhibits the trabecular



#### DESCRIPTION OF PLATE.

Fig. 2. -Abscessus apicalis (middle layer).

(1) Adenoid connective tissue.

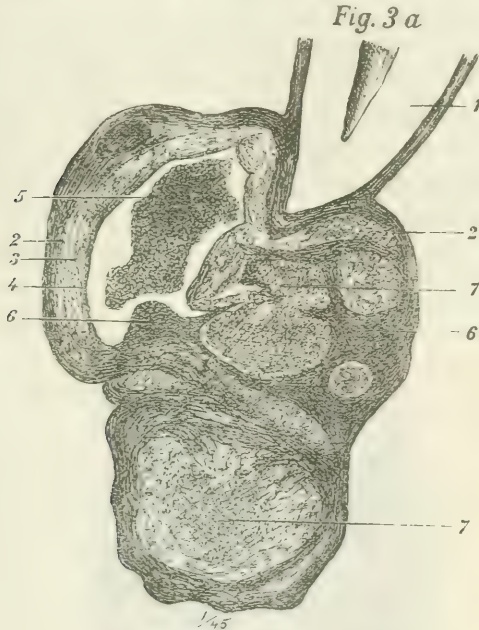
(2) Spindle-shaped connective tissue cells, arranged in rows.

structure which I have already described. The connective tissue cells forming the trabeculae were not so distinctly spindle-shaped, but rather stellate, and were much more compact in the trabeculae than in the islands, the latter being formed by clearly marked adenoid connective tissue. I think it is very probable that, had the pulp root been removed after devitalization, so that the cause of the purulent inflammation would have been absent, neither "periodontitis acuta purulenta diffusa" nor "abscessus apicalis" would have been developed, even despite the presence of "détritus épithéliaux." This case sufficiently indicates that many individuals are already predisposed to apical abscesses from the structure of their periosteum.

The trabecular arrangement of the connective tissue elements in the middle layer of the abscess-wall can certainly not be explained by the structure of the periosteum, but we would meet with just the same difficulty if we encountered epithelial cells and not connective tissue cells. Thomas David also rejects Malassez's theory, and asserts

that apical abscesses are inflammation products, since neither clinical nor pathological reasons exist which would justify our ascribing the origin of apical abscesses to embryonal germs.

In the majority of cases, therefore, the apical abscess is an inflammation arising consecutively from a diseased pulp, developing quickest in gangrenous disintegrated pulps, even if the apical foramen is not very wide, and septic material only finds an entrance slowly



#### DESCRIPTION OF PLATE.

Fig. 3.—*Cysta multilocularis* (pericemental hæmatoma).

(a) Semi-diagrammatic: (1) root of tooth, (2) outer and middle layers of cyst wall, (3) layer of stellate cells, (4) flattened stellate cells, (5) hæmorrhage, (6) epithelial layer, (7) fibrinous coagulum.

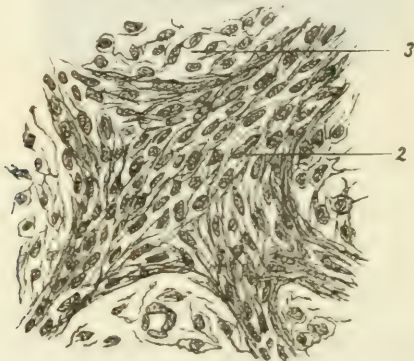
through this opening. But the disease of the periosteum does not entirely depend upon the features just mentioned, but also on the quality of the periosteum, *i.e.*, whether, on account of its strongly developed apical part, it is predisposed to the formation of "abscessus apicalis" or not; the presence of the "débris épithéliaux" is not necessary in *each* case. I lay a stress on this "not in *each* case," because the microscopic examination of one of the cases investigated by me greatly resembles the illustration of Malassez. The formation in question, however, was properly not an "abscessus apicalis" (*i.e.*, not accompanied by those symptoms which we meet



with in an apical abscess), but rather a multilocular cyst, or still more correctly, a pericemental hæmatoma.

I received the root of a second lower premolar for investigation, in which there was no longer any trace of the crown to be found. The root canal emitted a gangrenous smell. A long conical tumour was situated at the apex of the root. It measured  $2\frac{1}{2}$  mm. at its base,  $1\frac{1}{2}$  mm. broad in its under part, and 6 mm. in length. Its external surface was not smooth, but presented three large protuberances: the two upper to the right and left, and one below. With a slight pressure partial fluctuation, which was limited to the two upper protuberances, could be observed. This fluctuation indicated the presence of a fluid, and this supposition was confirmed when, on opening the upper left protuberance, some drops of a dark brownish-red disagreeable-smelling fluid flowed from it. When placed under the microscope it was found to contain disintegrated blood corpuscles and numerous micrococci.

FIG. 3 *b.*  $\frac{1}{630}$



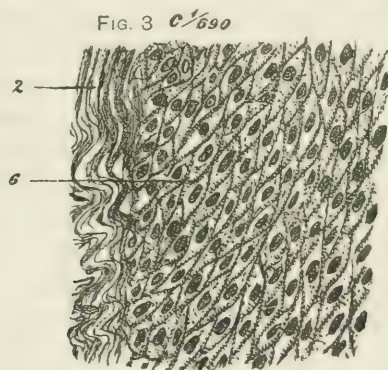
#### DESCRIPTION OF PLATE.

Fig. 3.—(*b*) Section of the cyst wall.

By means of a microtome I made a series of sections of this conical tumour, which I embedded according to the *Butchli* method, and found, as may be seen in Fig. 3 *a*, two cysts placed one over the other. The external parietal layer of each of these cysts, differing from "abscessus apicalis," did not consist of connective tissue cells, spindle-shaped and oblong cells closely packed in fibrous filaments, but of connective tissue fibres, between which small round cells were visible. Inside this layer there was a second, which was quite as broad as the external one, and consisted of very sharply outlined undulating scattered fibres. The innermost layer was twice

as broad as both the two external layers, and consisted of adenoid connective tissue, with stellate cells, whose processes formed an empty meshwork, in which form no elements at all were to be found. Nearer the cavity of the cyst these stellate cells always became thinner and narrower. The structure already described was to be found on the external surface of both cysts.

The dividing wall of the two cysts (Fig. 3, *a*,) consisted on one side of wavy connective tissue fibres, like those in the second layer of the external wall, through which a strand extended in the direction of the upper cyst, which was of unequal thickness, viz., thinner in the middle and thicker towards both sides. It sent processes to the upper cyst and even under a low power was found to consist of epithelial cells. This epithelial layer was most strongly developed in the lower right angle of the upper cyst, and through which ran a fasciculus consisting of connective tissue fibres, the latter being surrounded by a ring of epithelial cells. These epithelial cells were considerably narrowed at this spot, and resembled



#### DESCRIPTION OF PLATE.

Fig. 3.—(*c*) Section of the cyst wall, epithelial layer. The indications are the same as in (*a*).

a cylindrical epithelium, while they became thinner towards the exterior nearer the connective tissue wall. Under a magnifying power of 690 diameters, these cells resembled perfectly the epithelial cells of the gum, and one could even distinctly recognise their dentated edges here and there (Fig. 3, *c*,).

The cavity of the lower cyst was filled to its entire extent with loosely coherent fibrin coagulums, from which, scattered indistinctly, visible formations emerged, which resembled cells, and were probably shrivelled red blood corpuscles.

The upper cyst only contained this coagulum in its right half; in the left there was genuine hæmorrhage, which, however, had no connection with the wall, but, probably, originally floated in that fluid which flowed out when the left cyst was opened.

It is undeniable that epithelial cells have helped to form these cysts, but it is peculiar that they were only to be found in the common wall of the cysts, and therefore tolerably deep under the root of the tooth; also that they so perfectly resembled those of the gum. Because of this latter circumstance, we fail to recognise these epithelial cells as Malassez's "*Débris épithéliaux paradentaires*," *i.e.*, as rudiments of the enamel organ. We look upon them as the remnants of epithelium of the gum entangled in development, which would proliferate wonderfully under any irritation, such as the inflammation, for instance, of which the multilocular cyst was a consequence.

In this case, therefore, the formation of these cysts does not result entirely from the increase of the embryonal germs, but from the setting in of an inflammatory process; this is proved by the presence of partially coagulated, partially fluid, blood, which arose in all probability from periodontitis accompanied by hyperæmia and cellular proliferation. The embryonal germs increased all the more freely in the tissue of the periosteum since the inflammatory process had reduced its power of resistance. The contrary, of course, might also be asserted: that, for instance, the growth of the embryonal germs had taken place first, but the comparatively small number of the epithelial cells argues against this conception.

In the remaining four cases, however, in which I could not find any trace of epithelial cells, the mischief was developed in consequence of disease of pulp, and the form of the disease is occasioned by the greater amount of resistance offered at the apex from a stronger periosteum existing in some individuals than in others.

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## A NEW FORM OF PORCELAIN CROWN WITH GOLD COLLAR ATTACHMENT.

By FRANK CHASEMORE.

A MODIFICATION of the all-gold crown is, I think, a great desideratum in cases where the bicuspid and molar regions are prominently exposed to view in certain mouths. It struck me that a combination of porcelain and gold might be extremely useful in such cases, especially if an ordinary tooth might be adapted to the circumstances, without having recourse to special crowns, which are extravagant to stock in suitable quantities for matching. I have devised such a method, and the following is the mode of construction :—

The root having been prepared in the usual way for all-gold crowns, an impression and bite are taken and a zinc die cast. To this the band is fitted, and the joint soldered half-way up. A suitable tooth is selected from stock and backed with a plate bent to the curve of the underside ; the pins are then turned over against the backing to fix it securely, and the plate trimmed to the contour of the tooth. The band is now fitted to the cast and the upper edge filed away to fit the edge of the backing of the tooth, the edges of the unsoldered part of the joint being cut away, if necessary, to allow of the band being brought to the required size. When the occlusion is perfect,



the tooth is fixed to the band with wax and the whole removed from the cast. The crown is now turned mouth upwards and a little wax melted into the interior to fix the parts together, so that the first wax can be removed, and the crown invested in plaster and sand, mouth upwards, and the joints soldered *inside*. When the band is finished and polished, the crown can be cemented to the root in exactly the same manner as a gold crown.

The construction of this crown would be easier if some teeth were made the shape shown in fig. 3. Three pins would also add to the security of the tooth. Figs. 1 and 2 show the finished crowns.



**PROSTHETIC DENTISTRY.**

By Dr. H. H. NEWTON.

*[Part of a paper read before the Cleveland Dental Society.]*

ONE great reason why the best operators have ignored the making of artificial dentures is the fact that it is not quite as remunerative as the operative, and another fact that it is dirty work and consequently not so professional.

The time was when the fathers of the profession devoted themselves to each department of operative and mechanical, and did not consider it derogatory to their professional standing. At the present time a great majority of the artificial work is in the hands of a class of men who have but little fitness for their work. Who do not realize the fact that something is wrong when they meet these deformities of artificial teeth wherever they go. It is a disgrace to the profession that such a state of things has been permitted to exist. I am very glad to realize, however, that at the present time there seems to be a revival in the direction of prosthetic dentistry. The best men are taking hold of this matter in earnest. The various kinds of metal work are coming to the front where they ought to be, for they have had the back seat long enough.

I am very favourably impressed with Dr. Carroll's new process of casting aluminum plates, and I hope our best men will give it a fair trial. One good feature of it is that it will require great skill in its manipulation, and only the most skilful will be able to work it successfully. Some years ago I experimented in the casting of dental plates by the Hollingsworth method, but was not successful in results in nice work. I then tried the swaging of plates, and inserted quite a number of sets, but soon found that the material etched so badly in the mouth that I abandoned its use and was convinced that the metal itself was not suitable for dental purposes. Dr. Carroll seems to have purified the metal and combined others with it in such ways as to overcome many, if not all, the objections that were then so apparent. The work that pleases me best, and in which I have had considerable experience, is the combination of gold and rubber. We have in the gold plate cleanliness, strength and durability without thickness to interfere with the correct articulation of words. It is a good conductor of electricity, heat and cold, thereby keeping the sensitive membranes under the plate as near a normal condition as it is possible. The rubber being a plastic material, it enables us to build out and restore lost bone and tissue.

The first step and foundation for a perfect fitting denture is a good impression, which can be obtained in the following manner: First examine the mouth to ascertain what conditions we have to meet, then select a cup considerably larger than the mouth and take the impression in wax, reaching well over the alveolar borders, then harden the wax in cold water, and take a knife and trim away from the entire surface upon which you expect your plate to rest about two lines in thickness of the wax. Leave the wax intact at the back part of the impression next to the soft palate, to prevent the overflow of plaster into the throat. My reasons for taking an impression in this manner is to have an equal thickness of plaster over the entire surface of your impression, which makes the expansion of plaster equal, which is of great importance in practical work. You also save much annoyance to yourself and patients by not using much plaster, so you need have but little overplus. Before taking your plaster impression, hold your cup and wax over a lamp long enough to melt the wax to prevent them from separating in removing the impression from the mouth.

The next step is to ascertain the condition of the mouth, so that you may prepare your model accordingly. If there are soft parts of the palate the model should be scraped enough so the plate will compress the parts to some extent. The hard parts should be left alone. In shaping the models for moulding, if there are no undercuts, it can be tapered so it can be drawn from the sand without displacement, otherwise use Hawes' moulding flask, which is perfect of its kind, and by its use any model can be moulded perfectly. I use sand wet with water, and a little practice enables one to soon learn how to manage it. I prefer water because it is more cleanly than oil, and does not smell so badly in the office. After moulding and casting my zinc die I make one of Babbitt metal also. Then I melt my lead and pour it into my cast-iron swaging dish and dip my zinc die. I make two counter dies of lead in this way, one to make my plate with the zinc, and the other to finish my plate with the Babbitt die. Before finishing on the Babbitt, the plate should be nicely trimmed and soldered at the nose or front part.

In the process of swaging a gold plate great care should be used not to wrinkle or bruise the gold. Anneal often, and before annealing throw your plate into a bath of nitric acid to remove any particles of lead or zinc that may adhere to it. I use alcohol instead of sulphuric acid to remove oxidation—it renders the gold tough and is more

cleanly. One word in regard to the metals, zinc, lead and Babbitt. Do not let them get mixed, for they are incompatible with each other. Have a ladle for each. To keep your zinc in a nice clean condition use muriate of ammonia as a flux, and you will always make a clean smooth die. In swaging lower plates of gold do it in two parts, one at a time, and solder together by a lap of half-an-inch. Put finely ground flux between the laps and confine with two little clamps; the solder will flow in between the parts and will stiffen the plate at the point where it is needed.

The next and a very important step is to fit the plate to the mouth by trimming to the proper width so it does not impinge upon any attachments of the muscles. These should be left perfectly free to perform their functions unrestricted. However well a plate may fit the mouth the restriction of any of the muscles in speaking or mastication, the plate will be displaced.

We come now to another important step, to get the articulation which determines the size, form, length and colour of teeth. Now comes the artistic part of prosthetic dentistry. Select a set of teeth that will conform to the temperament of your patient. If it be simply an upper set with good lower teeth we shall not have much difficulty, but if it is an upper and lower we have to go by the temperament; even here, if we have studied temperaments well and know the types that produce certain forms of teeth, we are not wholly at sea. This part of prosthetic dentistry has not been studied as it should, and I am of the opinion that it can be reduced to almost an exact science. I suggest that we as a body give this subject more thought.

One point in the articulation of artificial teeth, which has been overlooked by men who have given this subject but little attention, is the articulation of their crowns. The keen observer of nature will be at no loss and is constantly learning lessons by which to profit in his daily practice. Who among us has not admired the well-filled arches of natural teeth and the beautiful arrangement in articulation of their outer and inner cusps, and how perfectly they are adapted to the purpose of mastication? In articulating artificial teeth we should follow nature as closely as possible. The inner and outer cusps should always articulate perfectly. If the outer cusps are the longest, we have a faulty masticating surface and a tilting plate and no end of annoyance to self and patient.

Dr. Bonwill, in his chapter in the "American System of Dentistry,"

says : " After more than thirty years of active practice in dentistry, I am fully persuaded that, of all that constitutes dentistry proper, the mechanical forms the basis. And yet to make anything that is beautiful in our art, especially in vying with nature in matching the teeth, we must be more than mere mechanics, more than capable of filling a tooth or treating an abscess : we must be *dental artists*. When we introduce a set of teeth upon which depends so largely the expression of the face from the soul beneath, we must bring to our aid not only the laws of mechanics and geometry, but the beauties of art. It is not enough that we accurately adapt the plate to the gums, that we so grind the teeth to the plate and make every joint perfect, that we so polish the plate over symmetrical curves that the tongue cannot find the least fault. We must do something beside this : we must impart action to these otherwise whited sepulchres ; we must instil life therein, or our labour will be in vain." A tooth may be elegantly shaped and coloured, yet, if it lacks the proper shape and colour for the person intended and is unskilfully set in the arch, it is a failure. The dentist's taste should be so cultivated that he will be apt to criticise his own selections.

Dr. Bonwill's ideas in reference to the geometrical and mechanical laws of the articulation of the human teeth are very forcibly illustrated, and are a valuable acquisition to our store of knowledge. It would be well if every student in dental practice should thoroughly study his methods and reduce them to general practice.

One suggestion I would like to make in reference to the articulation of partial sets of teeth. Do not under any circumstances let a natural tooth antagonize with an artificial, or where there are upper or partial sets do not let the artificial strike each other, but leave a space of about half a line between their crowns. It will obviate the clicking sound and also enable one to get through with a meal if a seed should get between the plate and gum.

As I have had some experience with the bridge-work, it will, perhaps, be expected that I shall say something in regard to it. It does not meet my expectations and it is my opinion that it will not have a very long run. It is a fine thing in some cases, but must be used with a good deal of caution and discrimination. It is a fine thing in lower front teeth where it is so difficult to make a plate. There is no one kind of work that will suit all cases.

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## THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE above Society held its first ordinary monthly meeting, after the recess, at its rooms, 40, Leicester Square, at eight p.m., on Monday, the 5th ult., Mr. HOWARD MUMMERY, M.R.C.S., L.D.S., Vice-President, in the chair.

Mr. STORER BENNETT mentioned the efficacy of S.S. White's nerve devitalizing fibre for destroying pulps; it contained arsenic, creosote, tannin and opium, and seemed to give less pain than other preparations. He also recommended litmus paper cones for drying out pulp canals. They were especially useful for fine and difficult canals, being both very stiff and very thin.

Mr. ROBERT WOODHOUSE supported Mr. Bennett's recommendation of the nerve devitalizing fibre, having used it for a long time. He believed it was first introduced into this country by Mr. J. T. Browne-Mason.

Dr. REDMAN also found it better than ordinary preparations. He added a little powdered cocaine to it, with, he thought, great advantage.

Mr. BOYD WALLIS showed models of the mouth of a girl aged 14, who had menstruated from her tenth year, in which all the wisdom teeth were fully erupted; also models of the mouth of a gentleman, aged about 40, in which there were no laterals in the upper jaw and six incisors in the lower jaw. He also showed an electric battery with a new arrangement of switchboard. The battery contained four Leclanche cells which would work the magnet to perfection; it would run for two years with very little trouble indeed. The cells had conglomerate blocks in the centre and large tubular zinc plates. A special feature was an arrangement on the battery box by which the cells could be reversed; with the resulting advantage that each cell was used up equally.

Mr. WALTER H. COFFIN showed an autograph letter from George Washington to his dentist. The chief interest, Mr. Coffin remarked, in the letter was that, in addition to acknowledging the skilful service rendered, he also enclosed the fee.

Mr. F. J. BENNETT, M.R.C.S., L.D.S.Eng., then read a paper on CERTAIN POINTS CONNECTED WITH THE STRUCTURE OF DENTINE.

In one of the numerous and interesting contributions to molecular physics in March, 1885, Dr. W. M. Ord stated that it was possible to etch the surface of pieces of ivory and mother-of-pearl by immersion

in a solution of subcarbonate of potash in glycerine. A year previously he (Mr. Bennett) had attempted to extend some of the well-known experiments of Rainey on the formation and disintegration of calculi with a view to obtaining artificial absorption and deposition in teeth and bones. Dr. Ord's paper came, therefore, as a welcome addition to his knowledge on the subject. He made various experiments in order to apply this method to the dental tissues, first using subcarbonate of potash in glycerine, and bicarbonate of soda, also in glycerine. At the same time, in order further to check this action, specimens were placed in pure glycerine alone. To his surprise, in both cases such similarity resulted that he was led to the conclusion that the real active agent in the decomposition must be glycerine alone, and since then he had used it exclusively.

His method of procedure was : (1) To grind and polish freshly extracted teeth sufficiently thin for microscopical purposes, then suspend them in pure glycerine, or over one of the compounds mentioned, for periods of from one to six months or longer, then wash and mount in glycerine for examination. (2) Freshly extracted teeth were immersed whole in pure glycerine for similar periods, then ground, polished and mounted as before. (3) Whole teeth were placed in very dilute solutions of glycerine, the strength of which was daily increased until pure glycerine was used, the specimens being kept in this for one or two months.

Examination with the naked eye showed that with pure glycerine alone there was neither obvious loss of tissue nor rigidity, the chief feature being the increased translucency of the dentine. On examining one of the sections with a low power under the microscope, taken from a young tooth, longitudinal to and including the pulp cavity, but without the pulp tissue, no conspicuous change was observable excepting in the dentine bordering on the pulp cavity, which presented a fringed and slightly laminated appearance. Under a higher power this appearance proved to be due to the loss of the intertubular tissue, leaving the dentinal tubes clearly defined ; but this removal had not entirely freed the tubes. Their course appeared interrupted at regular intervals by layers of membrane having a parallel direction to the surface of the pulp, the layers bearing a general resemblance to that seen in interglobular dentine. Circular apertures, however, not solid globules, occupied the surface of the membrane ; oval spaces were also found between the layers of the membrane. Through these apertures dentinal tubes could be seen crossing from one layer

of membrane to another, and completely freed of their intertubular substance; the tubes seemed to arise from the upper and under surface of the membrane, and in places arose distinctly as processes from the margins of the membrane, in such a manner as strongly to resemble irregular cells and processes. A characteristic feature, moreover, was the regularity with which the tubes were measured off in short lengths by the crossing of the membrane. The specimens varied, not so much as to the time they had been immersed before mounting, but as to the time they had been mounted; for if a drop of glycerine were added beneath the cover glass from time to time, the specimen continued to be acted upon indefinitely. In this way fresh layers of membrane and additional lengths of tube could be brought into view. He was of opinion, however, that in other respects specimens were best examined early, many seeming contradictory and anomalous appearances, in his judgment, being due to specimens being mounted too long or allowed to come in contact with air.

Having become familiar with the various appearances assumed by the membranous layers as seen in profile, he selected a specimen presenting to view a continuous and fairly flat surface of the young layer of dentine parallel to the pulp, taken from the inferior fang of a lower molar. In the centre, the dentinal tubes were seen directly cut across; as the sides were approached they became gradually more oblique. Besides the appearance of layer succeeding layer, before described, over large areas scattered cells appeared to have taken the place of the membrane. These cells, seen in every variety of position, were generally of an elongated stellate shape. They were best seen where the dentinal tubes were oblique in direction; from this point to where the tubes were cut directly across, a curious, and at first puzzling, appearance was presented. The uniform distribution of the dentinal tubes seemed broken by little gaps, as though they had been pushed aside. After careful examination, he concluded that these apparent gaps were cells similar in nature to those seen at the margins and other parts of the specimens, where they presented the more familiar aspect of stellate cells.

In connection with the appearances of membranes in the region of the pulp cavities, he might remind them that long ago it was pointed out by Salter and others that the interior of the cap of forming dentine on examination revealed an appearance of structure similar in its relations to interglobular layers of dentine. This he

regarded as strong confirmatory evidence of the effect of glycerine being non-destructive in its action, since it revealed appearances so exactly resembling natural ones. From the appearances which the specimens presented, it was manifest that the glycerine had acted in a selective manner, removing certain portions of the tissue only.

Various explanations might be given of the appearances described. First, it might be assumed that the membranes merely represented a part of the matrix itself, which possessed a greater power of resisting the action of the glycerine than the rest. It might further be assumed that the surface of the membrane itself presented unequal stages of calcification, so that portions of it had become removed, leaving behind the circular apertures. If this were true it might fairly accord with the theory of globular calcification in dentine. This explanation might be even strengthened by the fact that the effect of submitting interglobular dentine to the action of glycerine is to bring out exclusively and clearly the membranes which surround the globules. Further, it might be considered that the glycerine had produced separation of the layers of the matrix through the unequal expansion or contraction of certain parts. Upon this point, however, Dr. Lionel Beale had spoken very positively; he said that all tissues, both hard and soft, neither shrink nor swell in the strongest glycerine, if only the glycerine were first diluted and then gradually increased in strength. In order, however, to test the expansion of a substance almost identical in nature with the animal basis of dentine, he (Mr. Bennett) immersed a strip of gelatine in glycerine for some weeks, and a strip of gelatine was also immersed in water. At the end of the period, that in glycerine had not expanded or altered in measurement, while that in water had become softened and swollen in all directions. A third assumption would be to regard the appearances as evidence of cell structure.

Proceeding to describe the dentine in calcified pulps of old teeth, where much variety occurred, the author of the paper said, not only did the effects of glycerine show themselves well in those situations, but from the fact that it was impossible to preserve, in ground and polished specimens, both the dentine and parts of the semi-calcified pulp, he was yet able to obtain specimens showing cell structure and other tissues in sections ground and mounted directly in Canada balsam, which served well as a standard of comparison by which to judge of the distorting effects, if any, of glycerine. The result of these comparisons was greatly in favour of the glycerine, which



brought out the structures with greater clearness and removed the calcified portions, bringing into view the parts which underlie them. The appearances of specimens in which the dental pulp was also present he would leave to be described on another occasion, likewise the consideration of the appearances of enamel under glycerine, in order that he might add a word as to the effects of this re-agent on the cementum.

This tissue, as was natural from its containing the smallest proportion of lime salts of any of the hard structures of the teeth, was the most completely affected by glycerine, so thoroughly, indeed, that almost every trace of it could be removed by absorption. The absorption, however, was usually most visible in specimens which had been ground and mounted for some time.

Briefly to summarise the results of his investigation : first, it had established the fact that glycerine was capable under certain conditions of decomposing the hard tissues of the teeth, and that it probably did so by the removal of the intercellular substance or matrix, where it existed in a certain state of density ; thus, in the cementum, the least dense of the three tissues, it was most active, the cells being loosely united were unable to hold together, and disappeared with the surrounding decaification ; in the dentine, a tissue which there was reason to believe increased in density in the order of its deposition, the younger layers were chiefly affected. He need hardly point out, in conclusion, that beyond furnishing a new and valuable re-agent wherewith to study the tissues and furnish fresh data from which to reconsider certain points in the structure of dentine and cementum, there was that other aspect in which glycerine, from the manner of its absorption of the tissues artificially, might lead a step onwards to a better understanding of complex and hidden methods employed by nature herself.

Dr. ORD : I rise, sir, in obedience to your request ; and first let me congratulate Mr. Bennett upon the ability and suggestiveness of his paper. In the beginning he alluded to some papers of my own as bearing, from his point of view, upon his researches—which I may say I think do him great credit ;—they are scattered papers and cover a good deal of ground. I hardly know Sir, how far I may trespass upon the time of the Society, but I will not be very prolix. It happened two or three years ago that Surgeon-Major Bidie, now Sanitary Commissioner of Madras, wrote a letter to *Nature* to say that he had observed that certain glass vessels upon which white

ants' mud had been deposited became etched over that portion which had been so covered, and he asked if any acid was to be found in ants' secretions capable of acting on glass. It was known to me, from very long association with Mr. George Rainey that he had observed that glass surfaces were eroded when exposed to the action of carbonate of lime deposited in the presence of colloids. He had shown that a perfectly clean and perfectly smooth glass slide, after being placed for a time in a solution of gum with carbonate of lime, became perfectly dim, and was eaten out into little shallow round depressions. When carbonate of lime was deposited in gum it was seen taking, instead of the form of a rhombohedron, which it should take, a spherical form, and he demonstrated that the colloid annulling the polarities of crystallization allowed simple attraction to work unhindered, so that, where there should have been a crystal with plane surfaces and sharp edges, we got a sphere: where a colloid was formed on the surface of the glass it drew away molecule by molecule from the glass into itself forming a little bed in the shape of a slight hemispherical depression. I repeated Mr. Rainey's experiments, using gum, albumen, and glycerine together, and I obtained, after some length of time, specimens much more remarkable than Mr. Rainey's (simply owing to larger exposure) in the presence of a colloid and a perfectly neutral salt. It occurred to me to try ivory and mother-o'-pearl in a parallel series. I used, with regard to glass, glycerine and nascent carbonate of lime; but when I was dealing with carbonate of soda and glycerine in connection with ivory and mother-o'-pearl, although I used in some experiments no carbonate of lime, I still got marked etching. That, of course, raised a question of a different aspect, and I may say that these were not acted upon by carbonate of potash or carbonate of soda without glycerine. What I believe, then, to be the explanation is that whereas in the glass the etching had come about by "molecular coalescence," I thought we had here the evidence of "molecular disintegration." Let me explain these terms. Mr. Rainey, when he found spheres of carbonate of lime in gum, found that any two or more spheres coming into contact with one another coalesced gradually into one perfect sphere; this he called "molecular coalescence." When such spheres—really little pearls—were placed in a fresh solution of gum, they underwent dissolution, the earthy matter being drawn out of them, leaving only a ghostly sphere of the organic matrix. This Mr. Rainey called "molecular disintegration."

The contact of the glycerine and carbonate of potash with the surface of the ivory or mother-o'-pearl introduced a new colloid, and it would in like way disturb the original arrangement, draw out the earthy matter, and leave the matrix behind. This is the way in which I have explained the appearances. Mr. Bennett, in his experiments, has eliminated the carbonates and dealt only with glycerine. It is very interesting to notice that in proportion as the structure was less compact he has more readily drawn out the earthy material from its organic matrix, and where the organic matrix is more completely formed and more completely solid, he has left the organic structure well preserved, almost as if he had dissolved the earthy matter with an acid.

As to the cells, I will not express an opinion, except that I think these are re-arrangements of the earthy matter. However, he seems to have hit upon something which may be of great value in such researches as he is pursuing. He seems able from solid teeth to withdraw the inorganic without disturbing the organic matter. This, at least, seems to be the explanation of his interesting results. I should not like to say more until the specimens have been examined by polarized light to see whether they be organic spheroids or inorganic matter. While thanking you for your kind attention, I must express my gratitude to Mr. Bennett for putting us on a new line of observation.

MR. F. J. BENNETT: May I be allowed, sir, to break through the rules, and reply to Dr. Ord at once? as I believe he has to attend another meeting. There is no doubt in my own mind that the appearances of structure exhibited are not due to re-arrangement of the matrix. There is undoubted proof that it really represents a natural structure which we had not hitherto known to exist. We have similar examples in interglobular spaces, and there are other instances. Salter says if the inside cap of young forming dentine be examined, it will be found to possess a cellular appearance, very much that of interglobular dentine, and the appearances in my specimens are very similar. With reference to polarized light, I have submitted my specimens to it, and there is no doubt, after analysing them, that they are calcified structures. I think that those who wish to thoroughly follow up Dr. Ord's investigations will do well to read his own works; they are very interesting, and form a sort of second chapter to the leading works on this subject.

MR. JAMES STOCKEN: May I ask Mr. Bennett whether he has

been careful to examine his glycerine? After ordinary glycerine is kept some time it generates an acid.

Mr. HUNT: At what date were Professor Rainey's experiments made? I have an impression that I read of them very many years ago.

Dr. ORD: The chief observations of Mr. Rainey were published about 1858. I had been a student under him for about six years, and since then I have been a sort of Micawber, "waiting for something to turn up," and have made a good many investigations on bone and glass.

Mr. FAIRBANK: I should like to ask Mr. Bennett what he considers those cellular structures are—whether he considers that they are the original cells, and that the membranous layers in between these apparently cellular structures are simply the remains of original tissue?

Mr. WALTER H. COFFIN: Apart from the physiological and anatomical interest, which is very great, Mr. Bennett's investigations suggest an extension of the dissolving power of glycerine; it seems to rank with alcohol and water, the longed-for trinity of the old alchemists. It would appear that its dissolving powers are not quite exhausted yet, and that we have more to learn about it.

Mr. STORER BENNETT: Without having been actively engaged on these experiments, I myself can bear witness to the very great care that has been devoted to them, and therefore I think, if ever we are right in taking the result of scientific investigations on trust, we have a certain justification here, so far as they go, in accepting them until they are disproved. I wish to emphasize particularly the point which Mr. Coffin has mentioned, as to the very remarkable properties which glycerine would appear to possess—though originally a by-product of gas works, chiefly a source of trouble as to how it was to be got rid of. As to the explanation of the tubes and membranes which my brother speaks of, of course one may agree with or doubt his conclusions, but I think there is no doubt those appearances are presented under the microscope with a high power; whether his inferences are correct or not, further investigation alone will prove.

Mr. BETTS: Might it not be possible that these investigations might lead to a discovery with regard to erosion? Inasmuch as fats are very apt to lodge about the gums, may not some substance be generated having dissolving properties somewhat akin to those of glycerine?



Mr. HERN: Might I ask Mr. Bennett whether he has had any experience of these tissues under decalcifying agents?

Mr. F. BENNETT, in reply, said: I think I have answered the points which Dr. Ord raised which bear directly on the paper. Mr Stocken asked if I had carefully tested for any acid. It should be remembered that I had obtained certain results with ordinary glycerine, and having obtained those results, although it occurred to me to use Price's glycerine, I decided to continue with the same glycerine that I had commenced with. It matters not to me what substance I use so long as with it remarkable appearances are produced, but I may mention that I use Price's glycerine as a check. Mr. Fairbank enquired respecting cell structure, what I considered it meant, and to what origin it might be traced, that is to say I presume, he alluded to the pulp structure and to what particular parts of the structure it belongs. This is a branch of the subject I wish to leave to a future occasion; suffice it to say, I believe them to be *bonâ fide* dentinal cells. Mr. Coffin spoke with regard to the history of glycerine, and it is very interesting to notice what wonderful things it will do. Mr. Betts alluded to possible discoveries with regard to erosion; I had specimens of erosion submitted to glycerine, but I am sorry to say that up to the present they had not at all done what they ought; whether they will do so under a slight modification I cannot yet say. Mr. Hern asked the question whether I had examined specimens which had been acted upon by acids. I may say I have never seen any structures such as these; I claim that they are original, and bear no resemblance to decalcified specimens. I have first submitted teeth to the action of glycerine, then decalcified in chromic or hydrochloric acid, but there is no resemblance between the specimens under the action of glycerine and those under hydrochloric or chromic acid.

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### STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

AN Ordinary General Meeting of this Society was held on Monday, November 12th, William Hern, Esq., President, in the chair. The following gentlemen were ballotted for and elected members of the Society: Messrs. W. May, A. C. Gask, K. Schelling, H. Dormer, C. Preston, F. Lewis, F. Breese, P. Reading, R. M. C. Harrison, J. A. Rogers, C. E. Bromley, H. A. Forsyth, F. G. Hall,

W. H. Davies, P. Arliss, T. White, H. Phillips, W. H. Holford, H. May, A. C. Day, and Bailey King.

Casual communications were brought forward by Messrs. A. R. Colyer and M. Woolf.

Mr. F. C. Porter read a paper on "Plastic Fillings." A lively discussion ensued, in which the following members took part : Messrs. Woolf, Dunlop, Colyer, Oliver, Robinson, Dolamore, Baldwin, Pready, Knowles, and Harsant.

The usual votes of thanks having been accorded, the President announced that the next meeting would take place on Monday, December 10th, when Mr. F. Harsant would read a paper on "Fracture of the Jaws, and their Treatment."

The meeting was then adjourned.

## NOTES AND EXTRACTS.

### SENSITIVE DENTINE.

ONE of the difficulties to be overcome in tooth-filling is the occasional extreme sensitiveness of the dentine; and it requires considerable courage on the part of the patient to submit to the necessary cutting. Healthy dentine is endowed with but little sensibility, for if a tooth be accidentally chipped so as to expose a portion of the dentine without opening the pulp chamber, it can at first be touched without giving rise to pain, but, after twenty-four hours' exposure to the fluids of the mouth, it becomes irritable. Hyperæsthesia of the dentinal fibrils may follow any form of exposure—that due to caries, erosion, or fracture; and when present it varies considerably in intensity, not only in different teeth but in different parts of the same tooth. Immediately under the enamel, in proximity to the pulp, especially the fibres radiating from the cornua of, and just beneath the appreciably softened carious bone, are the situations of greatest sensibility. The two former are explained by anatomical facts. The dentinal fibres end at the periphery by forming a dense network, and open into the so-called interglobular spaces, which, however, are filled with protoplasm similar to that contained in the lacunæ of bone, the whole forming the granular layer of Tomes, and near the pulp the fibrils are both more numerous and of larger calibre. The deepest portion of the diseased bone is probably most sensitive, because the calcareous material has been removed, exposing the fibrils, while it has not

gone far enough to destroy them. It will be readily understood by this, that superficial cavities are often very sensitive; then, as the disease progresses and this portion of the dentine is destroyed, there comes a time when there is but little pain from contact with acrid fluid or solid substances, but acute sensitiveness is again met as the pulp is approached. Other things being equal, soft teeth, from their relative greater quantity of organic matter, will be more sensitive than hard teeth, although there are many exceptions to this rule; also the teeth of the young more than those of the aged. The various methods of treatment may be summed up under the following heads:—(a) Operative measures; (b) Dessication; (c) Cauterisation; (d) Local anæsthesia; and this is probably the order of their efficiency, although combinations are often valuable. (a) Sharp instruments, rapid motion of the engine, and taking advantage of anatomical knowledge by cutting away from the pulp and its cornua and across the line of the fibres, will suffice in most cases. After the insertion of a temporary plastic filling for a few months, it will generally be found that most of the sensitiveness has disappeared; and this is the best of all treatment if the patient is under constant supervision. (b) In order to get thorough dryness, the rubber dam must be adjusted and the cavity swabbed out repeatedly with cotton wool dipped in  $\text{CHCl}_3$ , or absolute alcohol, or, better still, a current of hot air passed through the cavity. Chloride of zinc acts partly as a dessicator and partly as an escharotic, but its application is usually very painful, and its use contra-indicated when the pulp is near. (c) Carbolic acid, chloride of zinc, nitrate of silver, and caustic soda all have their advocates, carbolic acid, perhaps, being the most general favourite. Arsenious acid left in for a few hours is most efficacious, but, owing to the numerous cases of death of the pulp resulting, is now rarely resorted to. (d) Cocaine alone, or in conjunction with sulphuric ether, although of great use as a local anæsthetic in treating pulps, has not proved of much service for sensitive dentine, as it is not readily absorbed. Other drugs, such as menthol and aconite, are equally disappointing. Dr. Ottolengui's method seems, as far as experience has gone, to give good results. He first dries the cavity with hot air, and sometimes uses carbolic acid as an escharotic, and then anæsthetises the dentine with ether spray. It is maintained that the pain produced is far less than the operation of cutting by any other method. It may be interesting to note the statement that, where teeth are forcibly wedged apart for the sake of gaining room for filling, the pain

of excavating is much diminished, presumably from constriction of the nerve as it enters the apical foramen. Cocaine injection into the gum, as used for extractions, has also been recommended, but has not given encouraging results.—*Lancet*.

#### A VICTIM TO COCAINE.

COCAINE, the latest-discovered anæsthetic, is, it seems, like its predecessors, chloroform, chloral, and morphine claiming its victims. A Swiss physician tells the story of a medical friend of his who has succumbed to its fatal allurements. The victim began with morphine, which he eventually exchanged for cocaine. As usual, his first experiments were attended by increased vigour of mind and body. This, however, was soon followed by mental and nervous depression. After increased doses of the drug, he experienced hallucinations, was compelled to walk round and round in circles, to endeavour to pick up needles where he knew none were to be found, and was at length left utterly sleepless and without appetite. To escape the fatal influence of the drug, he gave up his practice and went as surgeon in a ship bound for the East. At length, by means of long sea voyages, he overcame his craving, and was restored to health; only, as he knew, to fall a victim to the poison once more on finding it accessible. Persistent indulgence in the drug resulted in one of the most terrible of deaths—exhaustion from tetanus.—*Bristol Evening News*.

#### TOBACCO AND BACTERIA.

THE popular belief in the germicidal virtues of tobacco smoke (which we note has been revived in connection with the alleged immunity enjoyed by the cigar makers of Florida during the recent yellow fever epidemic) has received some confirmation in the scientific researches of Dr. Vincenzo Tassinari, first assistant of the Hygienic Institute of Pisa University. In a preliminary note on his experiments (*Centralbl. f. Bakteriologie*, Bd. iv., No. 15) he describes the simple apparatus he designed to test the effect on pathogenic organisms of exposure to the fumes of tobacco. The apparatus consists in a chamber formed by two glass funnels placed horizontally, and connected together at their mouths by paraffin. In this chamber is suspended from a loop of platinum a small piece of linen, with the threads of its lower extremity immersed in a culture fluid containing the microbes. The chamber is connected at one end by a tube with



a cigar or cigarette, and at the other by a tube containing a plug of cotton wool (to serve as a filter) with the mouth of the experimenter. The smoke as it is exhaled, therefore, thoroughly surrounds the linen soaked in the culture fluid, and after the experiment, which lasts from thirty to thirty-five minutes, involving the consumption of from three and a-half to four and a-half grammes of tobacco, the chamber is opened and the linen allowed to fall into a test tube containing fluid gelatine. Control experiments were also, of course, made. The micro-organisms subjected to this treatment included:—(1) *Spirillum cholerae asiaticæ*; (2) *Spirillum Finkler-Prior*; (3) *Bacillus anthracis*; (4) *Bacillus typho-abdominalis*; (5) *Bacillus pneumoniae* (Friedlander); (6) *Staphylococcus pyogenes aureus*; (7) *Bacillus prodigiosus*. The result varied with the variety of tobacco and the kind of microbe, but in every instance there was marked (sometimes very great) delay in the development of colonies in the gelatine as compared with that of organisms dealt with similarly, but without exposure to tobacco smoke. Indeed, the development of some was entirely prevented. For example, in the third series of experiments cited, where large Virginia cigars were used, the development of *Bacillus prodigiosus* was delayed for seventy-two hours, that of *Staphylococcus pyogenes aureus* for seventy-three hours, of *Bacillus anthracis* for ninety-seven hours; while of the others, mentioned above, no development of colonies took place after from a hundred and twenty-eight to a hundred and sixty-eight hours. Dr. Tassinari attributes these results to the chemical action of the ingredients of tobacco smoke. He proposes to extend his researches more fully, both as regards the effect of different kinds of tobacco upon these and other micro-organisms, especially the tubercle bacillus, and to determine the time of exposure as well as the amount of tobacco necessary to produce the full effect. He hopes also to ascertain what substance or substances are responsible for the germicidal action.—*Lancet*.

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#### A NEW ALUMINUM PROCESS.

MESSRS. BRIN BROTHERS, the inventors of the industrial process of separating the oxygen from the nitrogen of the atmosphere, recently showed some experiments in connection with a new process of making aluminum alloys, at their laboratory, 9, College Street, Belvedere Road, London. An ordinary but rich clay was mixed with a reducing agent called by the experimenters "a flux," and made into a paste with

water. Some pig iron which had been run into bars three-eighths inch thick and two inches broad was broken into pieces. These pieces were charged with the paste and alternate layers of coke into a small cupola. A further quantity of coke to fill the furnace was put upon the top of the charge, and the blast from a fan turned on. In about twenty-five minutes the pig iron had melted. According to the inventors, nascent aluminum is produced in contact with the molten iron, and penetrates the same, the effect of the combination being to reduce the melting point of both metals and to yield a more fluid product than either of them separately. The contents of the furnace were then discharged into a ladle, and castings were made of the "aluminum steel," containing about 1.75 per cent. of aluminum. The nature of the flux was not revealed, as Messrs. Brin have not yet completed all their patents, but the inventors state that its cost is not higher than that of the clay used. The castings were exceedingly sonorous, for when suspended by a string and struck with a piece of metal the vibrations lasted from thirty to forty-five seconds. The castings were of white fracture, and free from blow holes. The silicon and some other impurities of cast-iron are thrown out in the form of slag. The aluminum has thus a twofold function in this process. It forms definite alloys with the iron, and aids in clearing out its impurities.

In another experiment the ready manner in which aluminum can be reduced by the process was illustrated. A piece of thin, soft scrap iron was coated with the clay and flux, and inserted in a blow-pipe flame. At a bright yellow heat the clay was reduced, and metallic aluminum became occluded in the whole thickness of the iron, giving the latter a white surface. The resulting metal, instead of being soft and pliable, became tough and springy, and it was claimed had acquired all the properties of first-class steel. Some of the alloy thus made was put into strong, pure nitric acid, and was not acted upon thereby; while a piece of the original scrap iron was rapidly attacked under the same circumstances. The proportion of aluminum in the steel produced depends, within certain limits, upon the proportions employed of the original ingredients for charging the furnace. Alloys of copper and of some other metals can be formed in the same way. Some copper aluminum bronze was exhibited; also such a bronze alloyed with from 17 to 20 per cent. of steel. This alloy can be made hard, and with a fracture like fine cast steel; or by careful annealing and repeated rolling a fibrous texture can be produced. Mr. Frederick

Varley, who has made experiments with Messrs. Brin's aluminium steel, states that it has all the properties of the best iron for conducting magnetism, while chilled castings will make excellent permanent magnets. He suggests the use of the bronze containing 20 per cent. of aluminum as telephone and telegraph conductors, believing that the bi-metallic character of the alloy will be found to be a corrective of self-induction. The principle of producing alloys by applying aluminous vapour in its nascent state is found to work with a long range of metals besides iron, and makes an exceedingly fine aluminum silver alloy, possessing valuable properties.—*Industries.*

### NEW INVENTIONS, APPLIANCES & REMEDIES.

#### MITCHELL AND ROBERTSHAW'S GAS AND ETHER APPARATUS.

THIS apparatus is designed for use with a plain rubber facepiece for the administration of nitrous oxide, either alone or in combination with ether; or it may be used for complete etherization. The valves, which are of the modern rubber flap type, are contained in a three-way stop-cock, and so arranged that by the simple movement of a tap well within reach, they may be used for governing inspiration and expiration; or they may be shut off altogether, allowing a free passage to and fro into the bag. The latter method is now adopted by several anesthetists towards the close of nitrous oxide administration, with the object of prolonging, to some small extent, the duration of complete anesthesia. The ether chamber is detachable, and has the great advantage of being adequate in size without being bulky, the latter feature being conspicuous in most apparatuses now in use. The amount of ether vapour which it may be desired to mix with the gas can be regulated to a nicety by an ingenious tap, and the supply of ether is poured through an opening secured by a strong-screwed cap of vulcanite. The latter detail will be appreciated by those who have experienced the difficulty of taking off a metal cap, which too often requires something more than persuasion for its removal. We would suggest that the bag sent out with the apparatus should be placed in close proximity to the stop-cock, so that the breathing may be as little embarrassed as possible.

The Dental Manufacturing Company have undertaken the manufacture; all the metal parts are nickel-plated, and appear to be accurately and substantially made.

## REVIEWS AND NOTICES.

SELECT METHODS IN THE ADMINISTRATION OF NITROUS OXIDE AND ETHER (a Handbook for Practitioners and Students). By FREDERICK HEWITT, M.A., M.D.Cantab. London: Baillière, Tindal & Cox. 1888.

WE scarcely think that the author has done himself justice by treating his subject in such a brief and concise manner. At first sight it seems impossible that even the "select methods" of one anæsthetist could possibly be set forth in forty pages of a little book which scarcely rises above the level of a pamphlet. In his preface Dr. Hewitt says "that it would seem desirable that everyone who is in the habit of administering anæsthetics should possess a thorough knowledge of the *mechanical procedures* (the italics are our own), by which general anæsthesia may be most efficiently produced by means of these agents; and the following pages are therefore submitted to the profession in the hope that they may prove of service to those who are desirous of obtaining information upon this particular subject." We quite agree that the "mechanical procedures" connected with the administration of nitrous oxide and ether, in common with other anæsthetics, ought to be thoroughly understood, but we hope that the student (for whom this little volume has been written) will not think that the information contained in it is intended as a sufficient guide to administering the two agents referred to, without further study of their relation to the general subject of anæsthesia. There is a tendency for the student to rely upon "tips" and "aids," mistaking them for primary knowledge, and we cannot too earnestly advise the discountenance of such tendency. To practitioners familiar with the subject of anæsthesia, the details of the author's methods will be appreciated as being clear and concise. We quite agree with the advice given that nitrous oxide should be administered as a preliminary to etherization. The patient is saved much distress, and the quantity of ether required is relatively smaller—a matter of no small moment to the dental surgeon, as it enables him to dismiss his patient more quickly than if a larger quantity of ether had been exhibited. We do not think that the practice of giving a "whiff of ether" with nitrous oxide should be recommended as routine practice in short dental operations, although Dr. Hewitt says that, in some cases he has met with, "the patients have expressed themselves as experiencing a more pleasant after-effect than that which they had on previous occasions noted after nitrous oxide alone,"



## Editorial.

### ELECTRICITY IN DENTISTRY.

AS an instance of the rapid march of science, and its adaptation to the varying needs of mankind, one would, perhaps, be inclined to place electricity in the very foremost rank; not only on account of the tremendous strides which it has of late taken as an abstract science, but more particularly in view of the fact that to it we owe so many of the material comforts which we are privileged to enjoy in these modern days, when Nature's secrets are being ferreted out at a rate which would fairly have puzzled our more easy-going forefathers. Science has always ministered to the wants of man—to the alleviation of his sufferings, and to the amelioration of his condition. It has done much, in conjunction with art, for our own specialty; and it is, therefore, but reasonable that, in reviewing the large field of usefulness which electricity now covers, we should enquire as to any special benefits which it is capable of conferring upon dentistry, and seize upon them, in the interests both of ourselves and our patients.

One of the most formidable enemies of the dentist (especially if he be located in London) is light—or rather the absence of it—during a large portion of his working hours. To attempt delicate work in a bad light is to court failure, to experience disappointment, and to tread that borderland where loss of self-control merges into despair. The electric light is doing much to lessen the gloom of our cities, and is eminently adapted to dental requirements from its peculiar advantages of brilliancy of illumination, absence of noxious products, and the definition of daylight hues of colour. To those within reach of having this beautiful lighting power “laid on,” there can be no excuse for not availing themselves of the boon—except it be that of expense. We understand, however, that the current is not suitable for purposes other than lighting; but, surely, this is an obstacle to be overcome in the future. To those who attempt anything beyond the casual use of a tiny oral lamp driven from a primary battery,

disappointment comes sooner or later ; and hosts of batteries, "guaranteed" to do the most marvellous work, have come and gone, like spectres of ill-fame. We are aware that a great amount of care and trouble in certain instances have yielded fair results, but if domestic lighting on a practical scale had been feasible from primary batteries, we should have seen them in general use long ere this. The hope of the present appears to cling to secondary batteries or accumulators, but the storage necessary for lighting on anything like an adequate scale must prove a stumbling-block to the general adoption of this system.

In the direction of motors and mallets, things are certainly more promising, for a large section of our younger operators have utilized primary batteries for these purposes for some years with a fair amount of success. It took some time to familiarize the public with the dental engine, and it is not impossible even to-day to lay one's hands on both practitioners and patients, who are strongly prejudiced against its use. In like manner, it will take some time to overcome the prejudice which exists against the employment of motors, but in future we have no doubt that they will become very general, and will be appreciated as lessening the dentist's exertions, while performing their work with greater effect, and less discomfort to the patient. Water-power has its advocates for this purpose ; but, whilst fully admitting its many advantages, yet we cannot ignore the fact that the general use of electricity for motor purposes in the future must also appeal to us, as being adequate, convenient, and economical. Meanwhile, we are casting about for suitable electrical motor power, and the principle of *storage* seems to be coming to the front. Should this method prove, after reasonable trial, to fulfil our requirements, the way will have been prepared for the more general utilization of dental motors.

If opinions differ as to the way in which we should drive our engines, the same is doubly true as to the methods of introducing gold ; and even those who employ mallets are sharply divided as to the particular form of blow which should be given. The advocates of the electric mallet are,

we believe, on the increase ; and, although it will probably never become a universal idol, yet we venture to prophesy, that it will hold its own in years to come as a reliable adjunct to cohesive gold filling. Although the form of the mallet needs much improvement, yet we are more concerned at the present moment with a suitable power for working it. All those who have had any experience of primary batteries know something of the chagrin caused by failure of power in the middle of a large filling, except reserve cells be requisitioned to help one over the stile. Our remarks on motors will also apply to mallets, and a reliable power will be hailed with much pleasure, not only as a solution of much that is perplexing, but also as a medium of making more popular an instrument which deserves the attention of every student of dentistry. *Perchance*

THE setting of artificial crowns is now occupying much attention, and the scope for ingenuity appears to be without limit. On another page will be found an ingenious method of a combination porcelain and gold crown for back teeth devised by Mr. Chasemore, which appears to be well within the range of practical utility. As a method somewhat startling in its novelty, we would call attention to that advocated by Dr. S. Davis, of Denver, which is thus described in his own words :—" All those who set artificial crowns to roots of teeth understand the advantages of having each piece separate, viz., the facing, band and pin. It is also desirable to have these in one solid piece before cementing to the root, leaving no place for secretions and having a strong, substantial crown. 1st, Adapt the band or ferrule to the root ; 2nd, take a plate tooth with pins crosswise, grind the cervical portion to fit over the band, neat with the gums ; 3rd, place the pin in position, close the pins in the plate tooth to hold the pivot pin, back up with wax to hold the band tooth, and remove all from the root. Mix some finely-powdered white glass with water and work in between the band and tooth crown, invest in marble dust and plaster, and remove the wax. With a blow-pipe gradually bring up to a red heat. Select a piece of white or opaque glass about the size of the wax removed. Fuse with a blow-pipe, and while in a molten state, press in by touch of an instrument, especially soap-stone, or clay pipe stem ground to suit, to fill the

space left by the wax ; when cool grind with a corundum stone to the desired shape, and polish with pumice stone on a felt wheel. Always cover the piece with asbestos foil while cooling. This is the practical crown and equal to any crown with the pin baked in."

It sounds well ; but experience alone proves the value of such suggestions, and yet the mere fact of a method being beyond the pale of common practice is no reason why, after proper trial, it should not be received as part of our orthodox procedure. Many members of our profession will continue to look down upon the crown which aspires to be anything more than the old-fashioned "pivot" ; whilst our younger brethren should be careful in adopting more modern methods, lest they be tempted to despise the older systems, which have undoubtedly done splendid service in efficient hands.

IMAGINATION is a faculty which runs riot in the human mind. Under due limitation it may be of immense service, and should, we are told, be cultivated by dentists, as instanced in a paper read at the Dublin meeting of the British Dental Association on the "Use of Imagination in the Construction of Artificial Dentures." Whether the dentist has need of imagination or not, it is certain that many of his patients exercise this faculty to a somewhat alarming extent in wearing the dentures made for them, where mental irritation is often more apparent than physical inconvenience. A somewhat amusing incident bearing on the subject is reported from New Orleans. A medical man wishing to test the practical effect of mind disease, gave a hundred patients a dose of sweetened water ; fifteen minutes after, entering apparently in great excitement, he announced that he had by mistake given a powerful emetic, and preparations must be made accordingly. Eighty out of the hundred patients became thoroughly ill, and exhibited the usual result of an emetic ; twenty were unaffected. The curious part of it is that, with very few exceptions, the eighty "emeticized" subjects were men, while the strong-minded few who were not to be caught with chaff were women. We do not say that wearers of artificial dentures are given to exercise their imagination to such an extent as the victims of the foregoing incident ; but it is at least wise to be on one's guard, lest a patient's statement should not be corroborated by actual fact, which might have been ascertained had observation and judgment been permitted to fulfil their functions aright.



## ROYAL COLLEGE OF SURGEONS OF ENGLAND.

### PASS LIST.

THE following gentlemen having passed the necessary Examinations at a meeting of the Board of Examiners on the 7th instant, were at the same meeting admitted Licentiates in Dental Surgery, namely:—I. J. H. Boyton, 2, Woodlands Road, Barnes Common; W. H. Dolamore, 93, The Grove, Ealing, W.; F. G. Grimsdale, 53, High Street, Uxbridge; F. A. Harsant, 16, Parliament Hill Road, N.W.; A. S. Hayman, 5, Belle Vue, Clevedon, Somerset; H. L. C. Hope, Rockholme, Hastings; F. R. Howard, Villa Road, Handsworth; W. T. Madin, Shustoke, Colehill, Birmingham; E. A. Manton, 51, Frithville Gardens, Shepherd's Bush; A. E. Marten, 22, Tyson Road, Forest Hill, S.E.; J. Mountford, 2, Richmond Terrace, Clapham Road; A. C. Pritchard, 13, Delamere Terrace, Bayswater; L. C. Smith, Grove House, Durham; P. L. Webster, 2, Redesdale Terrace, West Hampstead; C. Winterbottom, M.R.C.S. Eng., 16, Sloane Street, S.W. Eleven candidates were rejected.

### APPOINTMENTS.

Mr. E. C. Fisk, L.D.S.Eng., to be House Surgeon to the National Dental Hospital, Great Portland Street, W.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London, and at the Dental Hospital, Manchester, from October 1st to October 31st, 1888:—

				London.	National.	Victoria.
Number of Patients attended ... ..				—	2164	1170
Extractions	{ Children under 14	...	...	394	252	847
	{ Adults	...	...	1,057	533	
	{ Under Nitrous Oxide	...	...	903	768	
Gold Stoppings ... ..				365	106	34
Other Stoppings... ..				1,216	542	120
Advice ... ..				146	424	—
Irregularities of the Teeth ... ..				97	73	—
Miscellaneous and Dressings ... ..				407	243	380
Total ... ..				<u>4,585</u>	<u>2,941</u>	<u>1,470</u>

## GOSSIP.

THE practical value of clinical teaching is so well established as a necessary part of medical education that any advancement in this direction must be hailed with satisfaction as applied to the training of the dental student. A course of clinical lectures and demonstrations has just been inaugurated at the Dental Hospital of London which will prove of immense value to the students as an adjunct to the instruction given by the special demonstrators. Each member of the staff is pressed into the good work, and every week a lecture or demonstration is given throughout the session on subjects of practical utility. In this way a variety of subjects treated from various view-points are presented, and a list posted in the hospital gives the student an opportunity of "looking up" any particular subject before the lecture is given.

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Dr. ORD was one of the speakers at the last meeting of the Odontological Society, and received a hearty reception at the hands of the members, not only on account of his distinctive position in the scientific world, but also because of the special knowledge which he brought to bear on the subject under discussion.

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THE *Pharmaceutische Centralhalle* states that glass may be filed easily and without danger of breaking by dipping the file into strong soda lye and then, while still wet, into coarse sand.

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A RECIPE for tooth powder lately vouchsafed by a speaker at a recent meeting of the "Dental Societies of Connecticut and Massachusetts" is sufficiently remarkable to justify its reproduction for the benefit of our readers. "Take of floated chalk,  $\frac{1}{3}$ ; bicarbonate of soda and baborate of soda, each,  $\frac{1}{8}$ ; salicylic acid,  $\frac{1}{50}$ ; extract of cinchona,  $\frac{1}{33}$ ; oil cloves,  $\frac{1}{50}$ ; oil sassafras,  $\frac{1}{50}$ ; and oil cassia,  $\frac{1}{50}$ ."

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A RECENT number of the *Illustrated Medical News* reports the following death from inhaling chloroform for toothache:—"An inquest was held last week at Penge on the body of Florence Jones, who died during the previous Sunday from inhaling camphorated

chloroform. She had been in the habit of inhaling it from a handkerchief for toothache." This is the first time that we remember reading of a death from such a cause ; and it should not only be a warning to chemists, who are too ready to supply the suffering public with drugs of their own recommendation, but also to dental surgeons, who are sometimes compelled to prescribe "home remedies" of a poisonous nature.

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A NOVEL plastic filling has been recommended by Dr. H. B. Tileston in the shape of a combination of amalgam and oxyphosphate of zinc. He first mixes them separately, and then kneads them together, pressing out all excess of mercury, and, whilst still in a plastic condition, inserts into the cavity. When set, the filling may be burnished in the usual way. It is claimed that the mixture is durable, and very useful in appropriate cases. Perhaps some of our readers will experiment, and let us know their results.

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WE understand that a musical society has been formed in connection with the Dental Hospital of London Athletic Club. Although music is scarcely recognised as pertaining to athleticism proper, it will not be denied that singing plays a not unimportant part in the development of the chest—a development much sought after by athletes. Mr. David Hepburn has been appointed president, and Mr. Vernon Knowles acts as secretary. The first effort of the society at the annual dinner on December 1st is looked forward to with some interest.

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A DIFFICULTY experienced by most of us, even if we be unconscious of the defect, is the power of expression in language at once clear, brief, and comprehensive. Sailors, as a class, are peculiarly gifted in making themselves easily understood ; and Admiral Hall, in his excellent book bearing on this subject, gives a characteristic instance of "Jack's" accomplishment in connection with dental matters. A sailor, wishing to have an aching tooth extracted, was asked by the operator as to the locality of the offender : "Oh," replied the patient, "it's the hindermost grinder aloft, on the starboard quarter."

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THE use of oil of peppermint as an antiseptic appears to be gaining ground. The fact of its being non-poisonous would suggest its usefulness for dental purposes. Prominence was given to its value as a surgical dressing by Mr. Leonard Braddon in the *Lancet* some time ago. It is stated to be a powerful germicide, acting quickly and, whilst readily diffusible, does not evaporate so speedily as to be rapidly exhausted.

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AN interesting case of *Cancrum oris* in a Sepoy, twenty-six years of age, is reported in the *British Medical Journal* of November 3rd. The patient was admitted into hospital suffering from an acute attack of dysentery, having a temperature of  $104^{\circ}$  F., and frequent liquid motions, consisting principally of blood. The ulceration took place on the inside of the right cheek, near the corner of the mouth, and extended rapidly, causing perforation of the cheek, the lower lip hanging down and leaving a black irregular slough. Recovery took place, and was probably due to the following active treatment: the frequent and free application of fuming nitric acid; the removal of sloughs by scissors and forceps; frequent irrigation with a solution of perchloride of mercury (1 in 1,000); and the application of charcoal poultices to external sloughed parts. Nourishing food and brandy were administered, and chlorate of potash in combination with perchloride of iron given internally. The successful issue of the case justifies our notice of the treatment adopted. *Cancrum oris* is an affection which should be thoroughly understood, as, although cases are rare, it might easily come under the dental surgeon's notice at an early period, when a correct diagnosis is absolutely essential in the patient's interest.

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WE trust that those members of our profession who attended the International Medical Congress held at Washington last year impressed our American brethren with more respectful appreciation in the matter of their oratorical performances than seems to have been the case in connection with a recent congress met to discuss the subject of cerebral and spinal surgery. Referring to English medical speakers, a correspondent of one of the American papers thus amusingly writes:—"While it has been a pleasure to hear our transatlantic brethren, one is forcibly reminded, in listening to their



frequent audible and unconscious vocal expirations, which create innumerable divorces between all parts of the speech, of the reply—er—which—er—a—er—gentleman is—er—said to—er—have made when somebody—er—called his attention to the habit, he said: 'To "er" is human, to forgive divine.'

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At a meeting of the Paris Pharmaceutical Society held last month, the subject of the relation of the now popular drug *Antipyrin* to *Analgesin* was discussed. The following short account is taken from the *Chemist and Druggist*:—"M. Julliard related some comparative experiments he had made with analgesin and antipyrin, the two rival products. He had noticed some difference in their colour reactions with nitric, sulphuric, and hydrochloric acids; also with potassium bichromate as a precipitant; besides, the smell on heating the two substances are not quite the same. Professor Bouchardat remarked that the colour reactions mentioned were quite variable and obtainable with many organic substances, so they signify but little.

"M. Petit made an answer more to the point. He said that, like antipyrin, analgesin may contain traces of foreign substances, their presence may affect colour reagents, but therapeutically it is of no consequence. Analgesin is crystallised from acetic ether, while antipyrin is, for good reasons, thought to be crystallised from benzine, an objectionable but cheap menstruum now and then recognisable in the crystals. Otherwise the two substances are chemically identical; both antipyrin and analgesin have now been used too extensively side by side to admit of any doubt. 'And,' said M. Petit, 'if my fellow-pharmacists wish to see the process in actual operation, they are welcome to have a look at it in my place, where it is under way, and not on a very small scale either.'"

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THE next meeting of the Odontological Society will be held on December 3rd, 1888. Paper by Dr. Mitchell on "Some Suggestions on Metal Cap Crowns." Casual Communications by Mr. Bland Sutton, and Dr. St. George Elliott "On Copper Amalgams." Exhibit of a series of storage batteries and other electrical apparatus.

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## LETTERS, NOTES, AND QUERIES.

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Communications respecting Editorial matters should be addressed to the *Editor, 2, James Street, Buckingham Gate, S.W.*

All Advertisements and business matters should be sent to the *Publishers, 6 to 10, Lexington Street, W.*

Correspondents must authenticate their communications (which should be written on *one side* of the paper only) by attaching their names—not necessarily for publication.

*Queries and Answers* are invited on all subjects of interest, either surgical, mechanical, or ethical.

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### QUERIES.

**MECHANIC.**—Will Mr. Fletcher or any of your scientific readers tell me how the porosity of rubber can be scientifically accounted for; and explain why certain rubbers are less liable to the defect than others?

**L.D.S.I.** asks for information respecting a reliable modelling composition, and would be glad to hear of a formula from which he could make his own. He finds the two great disadvantages of those he has used to be either *harshness* or *springiness*.

"O TEMPORA, O MORES" writes:—"I was amused when I read in Dr. Stack's recent paper on 'Dental Ethics' the following advice—'Dentists calling on brother practitioners should not be detained. It is a piece of vulgarity and stupid affectation to keep a brother dentist waiting with the object of impressing him with the number of your appointments.' I will relate my experience of the first and last time that I ventured to call upon an unknown fellow-practitioner. I may mention that I have practised in London for many years, and it has frequently happened during this period that some of my patients have gone to a well-known winter resort on the southern coast, I have therefore given them the name and address of a dental practitioner in that town; but in answer to the usual query 'Do you know him?' I have been obliged to reply, 'No, excepting by name.' As I happened to be staying a few days at — during last September, I called upon this gentleman, and I mentioned to the servant that I did not call professionally, and would not keep Mr. — two minutes. I waited from twenty minutes to half-an-hour to no purpose, and as it seemed probable that I might have to remain an indefinite time, I wrote my name and address upon a piece of writing paper, and stated that I had simply called to make Mr. —'s acquaintance, and left the house. I have not since heard from Mr. —, and I feel somewhat grieved, in the first place for having been unnecessarily detained whilst paying a friendly visit, and secondly, for not having received the vestige of an acknowledgment of what was intended as an act of courtesy. Am I hyper-sensitive in the matter? or is my grievance substantial?"

\* \* We are of opinion, from the facts before us, that Mr. — is certainly guilty of most unprofessional conduct, and we are not surprised that "O Tempora, O MoreS" feels hurt in the matter, as his visit was intended as a courteous one. It is quite possible that the message delivered by the servant may have been misunderstood, but this does not acquit Mr. — of gross discourtesy in not having acknowledged by letter the visit of our correspondent, especially as the name of his visitor had been written down, and could not have failed to remind him that a word of explanation or apology was due.

W. D. is thanked for his communications.

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### THE DENTAL HOSPITAL OF LONDON.

THE Staff and Past and Present Students dined together, in accordance with their annual custom, on the 1st instant, in the Venetian Saloon of the Holborn Restaurant. The animated scene in the reception room, which became quite crowded some time before the dinner commenced, shows that this annual gathering runs no risk of a decline in popularity; hearty greetings were being exchanged on all sides, and the Babel of tongues, to a nervous reporter, was quite confusing.

Mr. James Smith Turner was in the chair, and was supported by Drs. Mitchell, Bruce, Hewitt and Theodore Stack; Messrs. Coward Owen, J. W. Hulke, Thomas Bryant, Christopher Heath, Hallett, Juler, Sibley, Trimmer, Winterbottom, Rymer, Pearce Gould, A. E. Hill, Brownlie, Underwood, Woodhouse Braine, Brudnell Carter, Hodges, C. S. Tomes, Bland Sutton, F. Weiss, Henri Weiss, Hutchinson, W. Ash, and about a hundred Past and Present Students.

An excellent selection of vocal and instrumental music was rendered in a most creditable manner by members of the Musical Society of the Hospital, with the assistance of Mr. H. L. Fulkerson. Special criticism would be invidious, yet it is difficult to pass over the excellent efforts of Mr. David Hepburn without a word of thanks, for to him the musical success of the meeting was mainly due.

The CHAIRMAN, in proposing "The Queen," interestingly reviewed the principal social changes which had taken place during Her Majesty's reign, remarking that it was phenomenal for its splendour, its magnificence, and its beneficence.

The other loyal and patriotic toasts having been duly honoured, the CHAIRMAN, who on rising was greeted with prolonged cheers, then proposed "The Past and Present Students." He said:—Gentlemen, I once again ask your kind indulgence while I propose to you what I think may almost be called the toast of the evening, so far as we are concerned; it is the health of "The Past and Present Students," and this is a toast which is increasing yearly in importance, for, as a matter of course, year by year the number of past students increases; and although, not as a matter of course, yet as a matter of fact, year by year the number of present students increases, for ever since dentistry was established a profession, and ever since a curriculum has been formulated, which can call forth the intelligence, the perseverance, endurance and manipulative skill of the student, and

ever since it has been made manifest that the profession of a dentist is one which may be followed by gentlemen in an honourable way, and in a way conducive to their own advantage and the welfare of society, that it is a profession in which both art and science may be combined to mitigate the sufferings of humanity and enhance the happiness of humanity, and prolong human life ; ever since these things have been recognised the number of students has increased.

It is not quite yet ten years since the life-long labours of Mr., now Sir John, Tomes and his colleagues culminated in passing the Dental Act. The gentlemen who worked with him are many of them spared to us yet, but I regret to say that neither Sir John Tomes, Sir Edwin Saunders, nor Mr. Cartwright and others are here to-night. They are prevented by circumstances which will overtake all of us if we live long enough. It is only in the course of natural events that we miss them from the festive board, but we miss them none the less. But I see here to-night our esteemed friend Mr. Underwood ; I see here to-night Mr. Hill ; Mr. Weiss is also with us, and last, though by no means least, we can see that old stirrer up of dental reform, Mr. Alderman Rymer. Well, gentlemen, I would recall to you the fact that throughout a lifetime many of these men worked with one object in view, and that was the elevation of their profession, and they had a steady and clear notion of how the object was to be obtained ; they saw clearly that it was not to be obtained by any process of exclusion, not by building a ring fence, but that it could only be secured by solid education. It was this clear purpose kept ever before them that enabled them to wait until the dentists recognised the fact, and it was this same purpose that enabled them to receive with pleasure the first manifestation of feeling which is necessary to action, and that manifestation soon took the form of a Dental Reform Committee. Well, I believe that if it had not been for the labours of the pioneers in dental reform through a period of more than a quarter-of-a-century, labours in which Chas. Jas. Fox bore a conspicuous part, it would have been almost impossible for the Dental Reform Committee to have been constituted, and if such a committee had been constituted it would have been no further on the road to-day than it was then. The Dental Reform Committee has done much for us, but we must not forget upon whose shoulders has been laid the burden and heat of the struggle ; we must allude with pride to him who has LED us through twenty-five years of scientific education and scientific progress. This same guide it was that took the helm at this



time, and I do not think I shall trespass against the canons of good taste when I say that the first bill—the foundation-stone as it were—of dental reform was drafted under the supervision of Sir John Tomes, and I think I may go further and say that it was at the instance of Sir John Tomes that Sir John Lubbock—one of the foremost scientific and social reformers—undertook the introduction to and piloting through Parliament of the Dentists' Bill; he undertook this in the conscientious belief that it was desirable for the welfare of the public and of the profession, and so assiduously did he undertake this task that before the bill had long been before Parliament he succeeded in changing it from a private to a public one, and as a public measure it passed through both houses and received royal assent in one session, a circumstance, I believe, almost unique in parliamentary history. Well, gentlemen, this act has been viewed variously, and it has been criticised variously; I am not going to stop now to answer those criticisms—I think they have been answered again and again—but whatever this Bill has done, and whatever it has failed to do, it has done one thing, it has given you the distinct title of dentist, and no sooner have you acquired your diploma and registered it at the office of the Registrar than you are marked men; you are marked as men who have passed a special education for a special purpose, you are marked as men who have gone through a preliminary examination in arts, precisely the same as is gone through by the medical student, and you are marked as men who have gone through an expensive curriculum. Now, gentlemen, the licence which this Act gives you is a licence in Dental Surgery; it is not conferred by any one corporation, it is granted by the Royal College of Surgeons, Ireland; the Faculty of Physicians and Surgeons, Glasgow; the Royal College of Surgeons, Edinburgh, and the Royal College of Surgeons, England; all these bodies issue one dental diploma, which is by the one with the abbreviated title of “L.D.S.” Well, gentlemen, in framing such a measure as this, it was necessary to consider vested interests—you know the Houses of Parliament are very jealous of vested interests—and when we proposed to establish a Dental Register, it was necessary to consider those vested interests which existed in many quarters. There were many gentlemen who were well seated in public estimation and well advanced in years; these gentlemen thought it *infra dig.* that they should present themselves for examination, and theirs was certainly a case for which special provision should be made. Then there came the “Mundella Clause,” which claimed consideration

for apprentices who were apprenticed before the passing of the Act. This clause has no doubt been much abused, but I cannot regret that it was put into the Bill, because I think that it was better we should suffer a few abuses than we should perpetrate one injustice. Then there came a motley group of people who claimed to have practised dentistry before the passing of the Act—I am afraid they did it in a way known only to themselves. These men, under a clause of the Act and by the exercise of the judgment of certain gentlemen on the Medical Council, were allowed to come under the Act; that proved to be very damaging to the dentist, but we had to tolerate it in the spirit of suffering, and also some abuses, rather than perpetrate one injustice, which is the spirit of the English law. Well gentlemen, with all these disadvantages we come back to the point that the Act has given you a title, the L.D.S., and this qualification is unalterable and enables you to be put upon the Register. This education, this examination, and this registration enables you to come before the public with a very strong case indeed, if you consider for a moment the Royal College of Surgeons—and when I speak of it, I would speak practically of the others I have named, only for brevity's sake I take that body with which we are more intimately acquainted. Well, gentlemen, if you look at the Examining Board of the Royal College of Surgeons, you will see it is composed of gentlemen who are selected from every part of the country because of their eminence as teachers or as practitioners, or both; and from this body one-half of the Dental Board is chosen; the chairman of the Dental Board is also chosen from the same body; these gentlemen examine in anatomy and surgery. The other half of the Board is chosen from amongst dentists who are eminent as scholars and practitioners, and so jealously are the students kept apart from the examiners, that on being appointed an examiner, the acceptor is expected to give up his appointments as teacher. Then again, as to education, if you look at the Medical Council of Education, you will see that it is composed of men from all parts of the kingdom: the universities send their representatives, the Privy Council sends its representative. Now, the Medical Council has undertaken the supervision and administration of the Dentists' Act, and it is to this council that the student has to go to register himself, when he can take his certificate in arts. It is also to this council that the student has to go when he is ready to be qualified, and it is then he can take the proud

title of L.D.S. Well, gentlemen, when the two institutions I have just referred to were appealed to—and I think it would be hard to find a tribunal that we could appeal to with a greater spirit of pride before the public as professional men—we had been examined by the R.C.S., and, after a curriculum which extends over five years, I think we are fully entitled to professional consideration. Now it seems to me that a man who has conscientiously worked up the curriculum which is placed before us as dental students must be a man who has not only a considerable amount of intelligence, but is capable of taking his position in the ranks of educated gentlemen, and I cannot believe that any medical man would begrudge a licentiate in dental surgery his due position. I cannot believe the stories which I hear of men holding the L.D.S. having been pooh-poohed and cold-shouldered by the medical profession. I cannot believe that any member of the medical profession would stoop to such a thing. If such a thing should happen, it must be *in spite of* the diploma, and not on account of it. We know that the medical profession is very jealous of its honour, and rightly so too, and they do not hesitate to visit with their displeasure any member of their own body, however talented or able he may be, who transgresses the unwritten code of honour; even now the air is full of their displeasure with some of their members. If we aspire to be regarded as professional men and to be recognised by the medical profession, we must be content to submit to the same wholesome discipline. As the medical diploma will not keep men in the paths of rectitude and honour, so in the same way the dental diploma will not do everything, for—and you must always bear that in mind—if you do not comport yourselves as professional men, if you do not live up to the professional spirit which has been inculcated in you during the time of your studentship, your diploma will do you very little good. Your diploma is your passport to consideration, but the amount of toleration and consideration you receive will be measured by a far different standard; it is for you to make or mar it.

Now, gentlemen, when the Act was passed, it was assaulted by the hydra-headed monster quackery. The first assault was made on the L.D.S. These gentlemen were wiser than the children of light; they at once saw the importance and the effect of that qualification, and they made haste to assume it on spurious grounds. One or two prosecutions were made by the British Dental Association, and I am

pleased to say they stopped that. Then we were assaulted by a number of men who openly contravened the Dentists' Act ; the proceedings of these men have been modified in some instances and I believe they will be still further modified. Now, however, we are brought face to face with another class of pretenders or charlatans, men calling themselves "American Dentists;" men who have obtained a "diploma" from the less reputable American colleges, not by merit, not by examination, but for a consideration. Some of these men have their names on the Dentists' Register ; some of these men, I regret to say, are our own countrymen, who, being on the register by reason of being in practice before the Act, not being able to obtain the L.D.S. by going through the curriculum, have made haste to cross the Atlantic and purchase the title of Doctor of Dental Surgery. Some of these men have been a protection to those who otherwise would not have been able to practice, and I need hardly say the public are their victims. Whether the public are duped by specious promises, or whether they are in ignorance of the nature of the dentists' diploma, they seem to be ready to be duped by them ; they seem to think, somehow or other, that by going to these men they get an advantage which they will not get by going to a reputable practitioner ; they like a lot for their money and they get a lot for their money, and that lot is often a very hard one. Now that these men have found the law will not permit them to use these spurious titles of "Doctors in Dental Surgery," they are advertising themselves all over the country as "Doctors"—they have dropped the "Dental Surgery," and have taken up the ambiguous title of "Doctors." I am sorry to say that in our own profession some among our reputable practitioners have, on the strength of an unregistrable title, followed the quack and thought it a grand opportunity for following their example and assuming the title of "Doctor;" but they have done worse than this, they have called themselves "American dentists," and all over the country now in the best centres of population you see men advertising themselves and practising as "American dentists." As I have said, some few of these men made a rush across the Atlantic and obtained a diploma at some of those colleges that every respectable American dentist would gladly see wiped out of existence, for, I am glad to say, we have gentlemen amongst us from America who have come amongst us as colleagues and as gentlemen, who join our scientific societies, and discuss freely the intricacies of dental practice, who give us the



benefit of their experience and who aid us in our researches and in the dissemination of knowledge ; these gentlemen we are proud to associate with. It is not often that we have the opportunity of speaking together, but I think I express their sentiment when I say that these gentlemen view with indignation the disgrace which has been brought upon their country and their profession by the class of men to whom I have been alluding. There is nothing in American dentistry proper which can do other than command our approval, which may not be practised by ourselves. Indeed all science and art is cosmopolitan ; it belongs not to one nation or race, but to the whole world, and if we may say this of science and art in general, how much more may we say it of that branch of it which is concerned with healing and the alleviation of human suffering. Well, gentlemen, it seems to me that we shall have the quack as we have the poor—always with us ; but we must be patient and remember that education, organization and unity will tell ultimately in favour of their extinction. I know also that those who have read the proceedings of the Medical Council this week may take heart of grace ; but I know too that if you drive these men from one position they will take up another. I think, however, it is our duty to enlighten the public, so far as we can, as to the true meaning and importance of the Dentists' Register and the title of L.D.S. ; that title of which we are all so proud and which we mean to raise to a position of still greater honour and esteem.

Well, gentlemen, I think I have taken up more time than I should have done. I did not know it was possible to have got so far away from the toast which I had to propose to you, and which was the object of my rising, but as it is said that "all roads lead to Rome," so all dental toasts and dental subjects lead to dental reform and dental education. I come back to the past and present students. I congratulate them sincerely upon the very excellent accommodation that has been provided for them, and also upon the very excellent staff under which they have to work ; I congratulate them, too, upon their spirit of independence and self-reliance which they have shown in their recreation ; the profession of their choice is an arduous one, and I am glad to see them throwing themselves heartily into those manly sports which will give them the endurance required for the fatigue of the operating room. The students' athletic club, cricket club, lawn tennis club, rowing club, and football club are doing well. I believe you have been doing exceedingly well in your football club.

I congratulate you also most sincerely upon the excellent work of your Students' Society ; and I must congratulate the present and immediate past students upon one fact which we may contemplate at a distance. We who have been long marching in the van find our marching powers are becoming very much impaired; we cannot expect to see the fruition of our labours—"one man may sow, another must reap." I may congratulate you, gentlemen, upon the grand harvest that is in store for you, and that is the time when the Dentists' Register shall contain only the names of those who have taken the L.D.S. ; then will the Dentists' Register fulfil the object of its fruition, and then will you perhaps look back and think of the wisdom of the men who provided it. With the past students I have to associate the name of my friend, Mr. Ashley Gibbings, who will speak for himself shortly ; with the present students I associate the name of Mr. Dolamore : this gentleman, I believe, has been distinguished not only at the general hospital but also at our special hospital, by the clever manner in which he has prevented other people getting prizes, but, evidently by the way in which you received his name, it has not diminished his popularity. Gentlemen, coupled with these two names, I give you "The Health of the Past and Present Students."

Mr. ASHLEY GIBBINGS, in responding, said that he hoped that they would not be disappointed if he did not traverse the excellent speech of their worthy Chairman point by point. He would only take one point, viz., the question of recreation, and he would say that recreation was as necessary to the Past as to the Present Students ; unfortunately, the means at their disposal were not so ample. London practitioners were apt to envy their more fortunate brethren of the country, who had the pure air, the unobstructed light, and the means of health-giving exercise at command. London men had often to do their work in an atmosphere of pea-soup, and find their recreation in a fog in Rotten Row or a tour through the streets of London on a bicycle. But if London men had their disadvantages, he thought they also had their advantages in the greater facility for the interchange of ideas, for social and scientific intercourse among their brethren.

Mr. W. H. DOLAMORE, who was heartily received, briefly replied on behalf of the present students, remarking that he was sure that they all endeavoured to do their work to the best of their ability, and that he was confident he represented their sentiments when he

said that they were not ungrateful for the kind way in which those efforts had been recognised.

Mr. A. PEARCE GOULD, whose rising was met with continued cheering, proposed "The Dental Hospital and Staff," and said :— Mr. Chairman and Gentlemen,—I feel that a great honor has been put upon me to-night in being entrusted with what I may without exaggeration say is the toast of the evening. You, sir, I think, spoke of the last toast as "almost " the toast of the evening, and I feel quite certain you had this toast in view when you made the reservation. It is one which commends itself most to those that I see around this board to-night. It is a toast which makes me almost wish I were older, that I might recollect this time thirty years ago, when we, who may enjoy the luxury of the dentists' operating chair, might have experienced the delights of being pulled round the early dentist's consulting room for half-a-crown, or dragged across the barber's shop for a shilling, or thrown on the floor of a blacksmith's forge for sixpence. I imagine, sir, I am right when I say that the establishment of the Dental Hospital of London thirty years ago was the commencement of dental progress; that the establishment of that hospital has done more than anything else to raise dentistry to the dignity of a profession, and for that not only we, who are more or less intimately associated with the dental profession, should be thankful, but the public should also be thankful, and, therefore, we and everyone, both inside and out, wish prosperity to the hospital—and happily it is not a wish only. The Dental Hospital is almost the only hospital whose funds increase from year to year; they are never in debt, they are never in want; a generous public pour money into their coffers; they add a new ward or a new wing and it is already paid for. Well then, sir, the patients too, at this hospital have an extraordinary way of multiplying: a year ago it was an extraordinary thing to have 40,000 patients passing through the hospital, now I believe they have 50,000; indeed, it seems to me that this is the only hospital able to keep pace with the enormous growth of the metropolis. This is a matter for congratulation when it is remembered that there are other institutions springing up which might be expected to draw off from this hospital a large number of its applicants, and it seems to me that it must be more important for this hospital to have a large number of patients, for, as I understand it, the students here do not merely watch their teachers, as they do at our hospitals, but each individual student performs his own opera-

tion, and that renders it exceedingly important that, with an increasing number of students, you should also have an increasing number of patients. I saw that one of the rules at this hospital is that each student should do 150 fillings in each of his two years; now, if you were to start that in our hospital, and make each student attend 150 labours each year, it is evident that we should require an enormous increase in the population. As to the staff, it would be invidious for me to say anything, except that it maintains its high position,—unrivalled probably throughout the world,—that it is in no way deficient in any of those gifts which it should possess. It is to three men once on this staff that the success of the hospital is principally due—Sir John Tomes, Sir Edwin Saunders, and Mr. Cartwright; long may they live. I have only to say, in conclusion, that I have been requested to couple with the toast the name of one of the surgeons of the hospital, Mr. Fred. Canton, and I have much pleasure in doing so.

Mr. FREDERICK CANTON, in responding, said :—Mr. Chairman and Gentlemen, in spite of Mr. Gould's very flattering remarks, I am sorry to say that the Dental Hospital of London is at the present time in debt, chiefly incurred by the enlargement of the building, but if we are poor in funds I am glad to say we are rich in students, and not only are we rich in quantity but also in quality, for our students distinguish themselves year by year not only at our own hospital but also at the general hospitals.

The enlargement of the building was necessitated by the increasing number of patients, and owing to the cordial feeling existing between the Managing Committee and the Executive Committee, we have been able to make the needed extension. I hope this feeling will always exist between the two committees. The hospital has the honour as it has the interest of all its students at heart, and endeavours to give them every facility for obtaining thorough knowledge of the profession they have chosen to follow. When a student is ready to qualify, he presents himself for examination at one of the Royal Colleges, pays the fee and gets his diploma. It appears to me that when the Colleges have issued the licenses they seem to think that there their responsibility ends, and they do not practically do anything to uphold the integrity of the licenses they have granted; the Royal College of Surgeons in Ireland has done what it can, the Colleges in Scotland I do not think are troubled much with black sheep; the R.C.S.Eng. seems to be content to say it has no power. It is desirable that these royal and important bodies should obtain the



power which they most assuredly ought to possess, and I hope and believe the day is not far distant when they will have those powers. I trust that when they get them they will not neglect to use them.

Mr. E. TRIMMER in felicitous terms proposed "The London and other Dental Schools of Surgery," and in doing so adverted to the absence of the Dean owing to sudden illness, remarking that there were few men to whom the school was more indebted than to Mr. Morton Smale. In conclusion, he begged to associate the names of Mr. Arthur Underwood and Dr. Stack, of Dublin, with the toast.

Mr. ARTHUR UNDERWOOD, after having referred to the deep regret which he was sure would be felt by everyone at the absence of Mr. Morton Smale, said that in replying for the School of London Dental Surgery, he was going to make a slight alteration and say "The other London Schools of Dental Surgery," when it occurred to him that there were other schools beyond London, that they were all working in the same direction; the schools of Edinburgh, Dublin and America were all working in the same direction and for the same good ends, and those good ends were the abolition of improper practices and quackery. And in that connection he might say that those to whom the interests of the profession had been confided had not been entirely idle, as would be found by reading the excellent letter which appeared in the last issue of the "Journal of the British Dental Association." It was proposed to reprint, publish in pamphlet form, and circulate that letter widely, so that their patients might no longer be ignorant of these matters. There were other responses to the demand which had been made for an effort to abolish quackery. In conclusion, he hoped that all schools would unite together for the destruction of illegitimate practice and for the union of those legitimate schools which existed in London and elsewhere.

Dr. STACK, who was very cordially received, said :—Mr. Chairman and Gentlemen, although I think you have chosen a most inefficient speaker, I am glad to have the opportunity of saying a word or two on the present occasion, and I thank you most cordially for having afforded it me. It is quite true that the school in Dublin is a small one, but I am happy to say that it is a growing one; it is growing both in students and in the attendance of patients, and growing also in the important way in which it is eliciting the sympathy of many of the teaching bodies. As Mr. Canton very kindly mentioned—and I think it is a very important thing to mention—

the Irish college has exacted from every student to whom they have given their diploma a solemn pledge that so long as they hold it they will not advertise, and they have not only done this, but they have on several occasions already deprived those who have forgotten their obligations of their diploma. Referring to the need for better premises for the Dublin Dental School, I must say that the Royal College of Surgeons, Ireland, is most kind in the way in which it lends us the use of its rooms. The other generous rival of the Royal College is the University of Dublin, which has a very fine medical school, and I am happy to say that within the last couple of months we have concluded an agreement to take a house from the University of Dublin on their grounds and we are about to extend it. It is quite true that for the present we cannot hope to induce many men to come from this side of the Channel to us, but as years go on—not by any system of underselling or shabby trick—we hope to make our teaching the best possible. I trust we shall at all events prevent Irish students coming over to the London hospitals. I thank you, gentlemen, for the very kind manner in which this toast has been received.

Mr CHRISTOPHER HEATH, in a few appropriate sentences, proposed "The Visitors," coupling with the toast the name of Mr. F. G. Hallett, who briefly responded.

Mr. S. W. SIBLEY, in proposing "The health of the Chairman," whose name was received with loud applause, warmly eulogized the great services he had rendered to the profession and to the cause of dental education and reform. His success had been greatly due to his untiring energy and perseverance. Mr. Smith Turner had always been ready to work when there was work to be done, and he had done it ungrudgingly and with good success. He would say Mr. Turner's chief characteristics were his indomitable good nature and cheerfulness. It was easy to be cheerful and to carry on a good work when things went smoothly, but it was not given to all men to be so when things did not go smoothly, and these were the qualities which largely belonged to their Chairman. Turning for a moment to business matters, he was a little shocked when Mr. Pearce Gould said that their hospital was in a flourishing condition. He could assure them that it was very poor, and very much in need of funds. He would not detain them any longer, but would ask them to do two things: first, to drink the health of their excellent Chairman; and, secondly, to do so with musical honours to the best of their ability.

Mr. JAMES SMITH TURNER briefly and cordially returned thanks.



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